Sound Levels and Sound Sources at Whitman Mission National Historic Site, 2001-2002.

April 2005

Skip Ambrose
Christine Florian
Natural Sounds Program
National Park Service
1201 Oak Ridge Drive
Fort Collins, CO 80525

Executive Summary

Sound Levels and Sound Sources at Whitman Mission National Historic Site, 2001-2002.

Median (L_{50}) sound levels at Whitman Mission National Historic Site averaged 39.2 dBA in summer and 35.4 dBA in winter, 2001-2002. Acoustic conditions were relatively stable, with most metrics (L_{eq}, L_{50}, and L_{90}) fairly close to one another. There was relatively little seasonal variability in acoustic conditions at WHMI, due in part to the year-round influence of non-natural sounds (vehicles, etc.).

Summer			
Month	**L_{eq}**	**L_{50}**	**L_{90}**
Apr			
May	45.2	39.1	34.4
Jun	45.2	40.4	35.1
Jul	43.6	38.7	33.7
Aug	42.8	38.7	34.1
Sep	43.1	39.0	34.1
Mean:	44.0	39.2	34.3

Winter			
Month	**L_{eq}**	**L_{50}**	**L_{90}**
Oct	40.8	36.8	32.1
Nov	38.2	34.8	30.7
Dec	35.3	31.5	27.6
Jan			
Feb	43.6	38.7	34.8
Mar			
Mean:	39.5	35.4	31.3

In summer, human-caused sounds were audible, on average, 66 percent of the time and in winter, and 51 percent of the time. Grounds care equipment (lawn mowers, leaf blowers, weed trimmers, water pumps) were the most common source of sounds >65 dBA and >10 seconds. The loudest human-caused event was a propeller aircraft (90.4 dBA) and the loudest natural event was wind in vegetation (80.7 dBA).

Sound level of normal conversation at 1 meter is about 55 dBA. For 100 percent sentence intelligibility, speech sound levels need to exceed background sound levels by 15-18 dBA. When background sound levels are equal to speech sound levels, intelligibility falls to about 95 percent. At Whitman Mission, non-natural sounds frequently exceed 55 dBA and have the potential to negatively impact the ability of park staff to provide outdoor interpretive programs.

Future soundscape work should include efforts to monitor acoustic conditions, identify sources of sounds that have the potential to or already are interfering with the park's purposes, and initiate efforts to eliminate or minimize activities or equipment that create sounds that interfere with park purposes.

Table of Contents

A CD with a .pdf file of this report and digital recordings of sound events exceeding a user-defined threshold is included with this report.

1.0 Introduction

The National Park Service (NPS) is concerned with degradation of natural soundscapes in many of the units of the National Park system. NPS Management Policies (4:9; 2001) states: "The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials."

"Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of the parks. The frequencies, magnitudes, and durations of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and generally lesser in undeveloped areas. In and adjacent to parks, the Service will monitor human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices. The Service will take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored" (NPS 2001).

In order to understand, manage, and protect soundscapes at Whitman Mission National Historic Site (WHMI), sound levels were measured and sources of sounds identified.

Whitman Mission National Historic Site is located west of the Blue Mountains in southeastern Washington. In 1836, Marcus and Narcissa Whitman arrived at a valley near the confluence of the Walla Walla River and Mill Creek to set up a Christian mission for the Cayuse people. The present 98.15 acre historic site is on a portion of the original land settled by the Whitmans.

The Enabling Act of 1936 identified the purpose of Whitman Mission National Historic Site as a "...public national memorial to Marcus Whitman and his wife, Narcissa Prentiss Whitman, who here established their Indian Mission and school and ministered to the physical and spiritual needs of the Indians..." The act called upon the National Park Service to "...maintain and preserve it for the benefit and enjoyment of the people of the United States." Additional, detailed information on Whitman Mission National Historic Site can be found at http://www.nps.gov/whmi/index.htm.

Whitman Mission National Historic Site (NPS 2000) has the following mission goals that relate to natural resources:

1. To preserve and protect the historic, cultural, and natural resources of WHMI for present and future generations;
2. To encourage others to assist in the preservation of the cultural and agricultural setting around WHMI and the historic setting of the Mission area.

The soundscape of WHMI is currently relatively quiet due to its semi-rural nature and agricultural setting. Nonetheless, sounds from agricultural equipment, occasional crop duster aircraft, passing freight trains, highway sounds, and routine NPS grounds maintenance equipment contribute to non-natural sounds in WHMI.

2.0 Objectives

The objective of this project was to provide baseline acoustic data necessary for preparation of a Soundscape Management Plan for WHMI. Specifically, these data include:

1. Sound levels in the primary vegetation types/acoustics zone in WHMI during all seasons of the year;
2. Identification of sources of natural and non-natural sounds in or near WHMI; and
3. Assessment of the timing, duration, and audibility of natural and non-natural sounds at WHMI.

3.0 Study Area

Whitman Mission National Historic Site is located in south-east Washington, 7 miles west of Walla Walla, approximately 0.3 miles south of Highway 12. WHMI is 98.15 acres, and includes the original mission grounds, the mass grave where the Whitmans are buried, and the 1897 memorial. The site also includes a museum/visitor center and headquarters/staff building, and staff housing.

The area is on the southern extreme of the Palouse Prairie Region. Originally, this prairie was dominated by perennial grasses, principally bluebunch wheatgrass. The region is classified as the Agropyron-Poa habitat. Large native herbivores were generally absent from the Palouse, and because of this, the grasses evolved with a low resistance to grazing. Subsequent grazing by domestic livestock and extensive cultivation for wheat are the principle reasons native grasses are now rare around WHMI (NPS 2000).

3.1 Management Zones at Whitman Mission National Historic Site

The majority of WHMI is “developed,” either as part of the Mission’s original development or the NPS visitor center, interpretive areas, or other park development. There are five management zones at WHMI (NPS 2000): Historic (Commemorative); Historic (Interpretive); Historic (Setting); Natural; and Park Development. These

management zones are shown in Figure 3.1.1. Cultural and landscape features are shown in Figure 3.1.2.

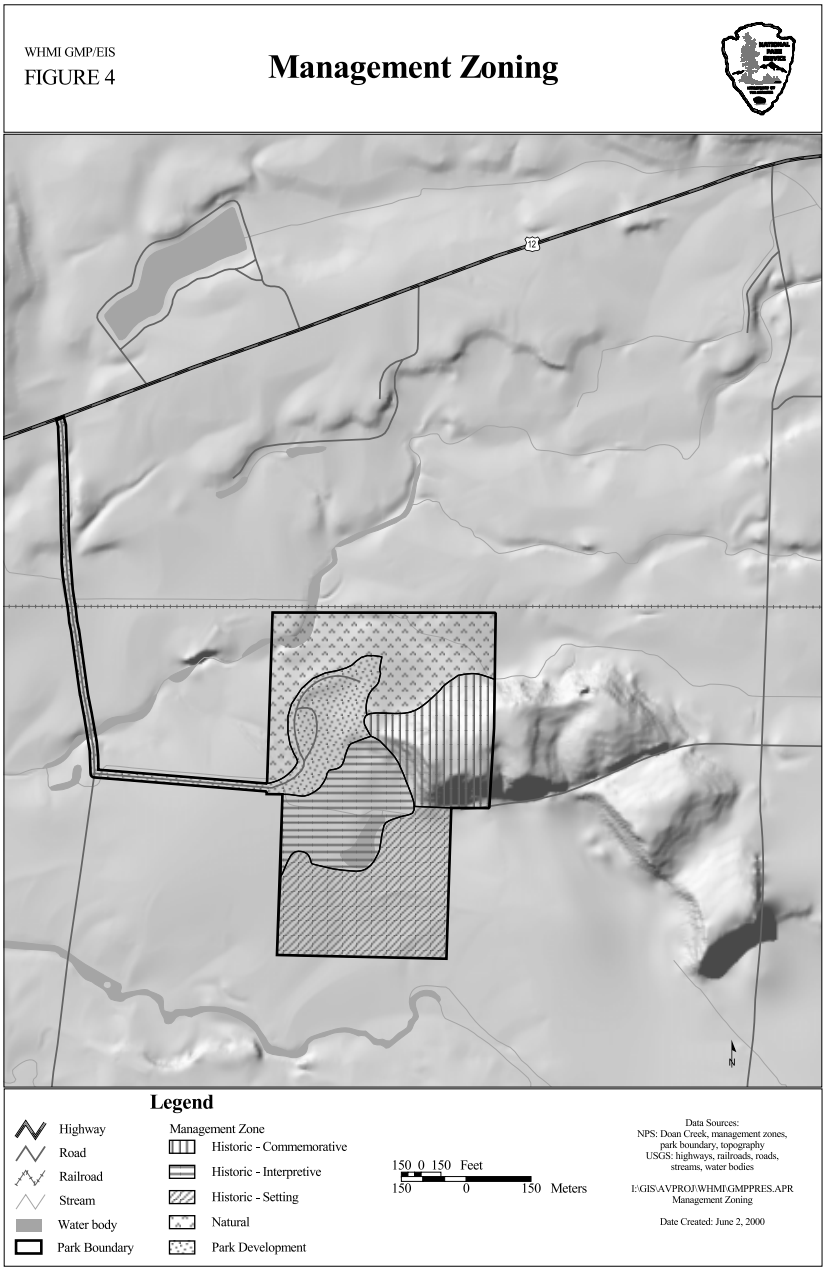

Figure 3.1.1. Management zones of Whitman Mission National Historic Site.

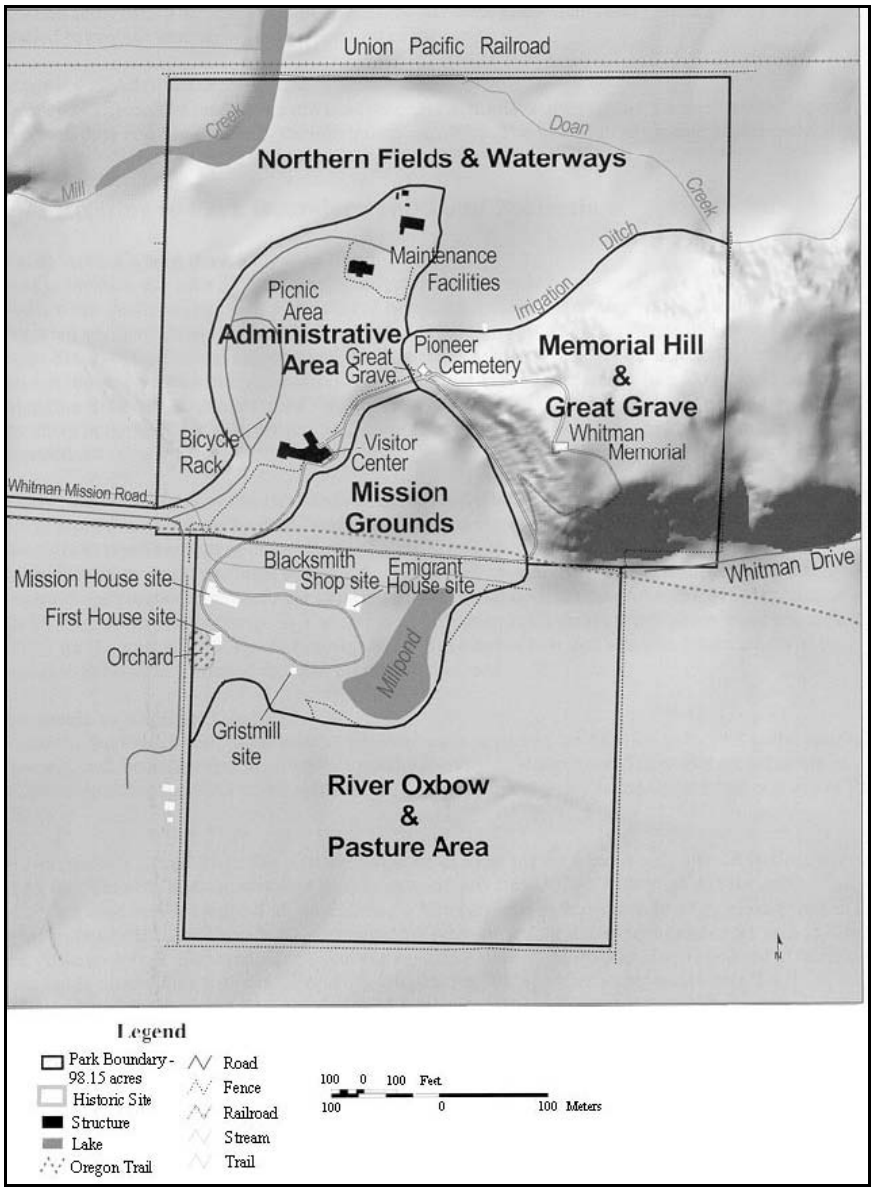

Figure 3.1.2. Cultural and landscape features of Whitman Mission National Historic Site.

4.0 Methods

The NPS Natural Sounds Program is developing a manual for acoustics and soundscape studies in National Parks. This document (currently in draft) includes an introduction to basic acoustics and protocols for soundscape studies in national parks (including data and metrics to be collected) and definitions of acoustic and terms. Specific methodologies, standards, and protocols for equipment type, microphone type, microphone placement and height, and other factors followed those in the draft NPS manual. These standards were based in part on American National Standard ANSI S12.9-1992, Part 2 (ANSI

1992), and the Federal Aviation Administration's "Draft Guidelines for the Measurement and Assessment of Low-level Ambient Noise" (Fleming et al. 1998). Because sound measurement equipment is changing rapidly, some changes in these standards were made. However, for the basic methodologies, we relied heavily on these two documents.

4.1 Acoustic Terminology

Definitions of acoustic terminology are presented in Appendix I. No single acoustic metric can adequately describe acoustic conditions, thus several are used.

The *Energy Equivalent Sound Level* (L_{eq}) is the level of a constant sound over a specific time period that has the same sound energy as the actual (unsteady) sound over the same period. In park situations, L_{eq} is useful for quantifying intruding sounds because its magnitude depends heavily on the loudest periods of a time-varying sound. L_{eq} of an intruding source by itself, however, is inadequate for fully characterizing the intrusiveness of the source. Judgments of the effects of intrusions in park environments depend not only upon the amplitude of the intrusion, but also upon the sound level of the "background," in this case, the sound level of the non-intruding sources, usually the natural ambient sound levels. L_{eq} must be used carefully in quantifying natural ambient sound levels because occasional loud sound levels (gusts of wind, birds, insects) may heavily influence (increase) its value, even though the sound levels are typically lower.

Percent Exceedence (L_x) metrics are the sound levels (L), in decibels, exceeded *x* percent of the time. The L_{50} value represents the sound level exceed 50 percent of the measurement period. The L_{90} value represents the sound level exceeded 90 percent of the time. The L_{50} and L_{90} metrics are used primarily to describe existing ambient and natural ambient acoustic conditions. The L_{50}, the median of all data, represents the existing ambient sound level. The $L_{90,}$ near the quietest range of the data, is frequently used to describe the natural ambient sound level.

Many different soundscapes occur in national parks. In some areas, natural sounds predominate, while in others, both natural and non-natural sounds occur. In order to understand and management soundscapes, ambient conditions for different soundscapes need to be acoustically described. *Existing Ambient Sound* is defined as all sounds in a given area (includes all natural and non-natural sounds). *Natural Ambient Sound* is defined as all natural sounds in a given area, excluding all non-natural sounds. The sounds of people walking and talking at normal levels (55-60 dBA at 1 meter) is considered natural; mechanical, electrical, aircraft, vehicle, generator, radio, etc., sounds are considered non-natural. Natural ambient sound is considered synonymous with the term "natural quiet," although natural ambient sound is more appropriate because nature is often not quiet. At WHMI, it is very difficult to accurately determine natural sound levels because there is nearly always some type of non-natural sounds present. As a result, the conventional use of L_{90} as an analog of natural ambient sound levels may not be appropriate.

4.2 Measurement Periods

A primary goal of the study was to measure sound levels in WHMI for an adequate period during the two major seasons, summer (April-September) and winter (October-March). Seasonal variability measured in other parks (Bryce Canyon National Park and Arches National Park, NPS unpublished data) indicate that a minimum of 25 to 30 days (600 to 720 hours) of data for the two major seasons, summer and winter, provide data within ± 3 dB of sound levels for the entire season (Dr. Hari Iyer, Colorado State University, pers. comm.). Thus, this was the minimum number of hours acceptable for this study.

4.3 Equipment

The acoustic monitor used at WHMI was a PC-based system using a Type 1 sound level meter and notebook computer programmed to collect acoustic data as well as high-quality digital recordings (Figures 4.3a and 4.3b). The monitor consisted of the following equipment:

1. Type 1 sound level meter, meeting requirements of IEC 804:1985, Integrating-Averaging Sound Level Meters.
2. Acoustic calibrator to establish acoustical sensitivity of the sound measuring system, to comply with Type 1 accuracy requirements of ANSI S1.40-1984 1980, American National Standard Specification for Acoustical Calibrators, or IEC 942:1988, Sound Calibrators.
3. IBM-compatible notebook computer with a minimum of 4 GB data storage and capable of 16-bit/44100 Hz WAV recording. The notebook computer stored 1-second L_{eq} data, digital recordings of events, and digital recordings of sample periods.
4. All equipment was placed in a weather-proof container.

A Larson-Davis Model 812 sound level meter was used in this study. This model does not collect one-third octave band data, hence only dBA are reported in this report. A Larson-Davis Model CAL200 calibrator was to check system calibration. A Panasonic CF-45 notebook computer was used to store decibel data, and collect and store wav files.

Figure 4.3a. Monitor box (at base of tree) and microphone (on tripod at right), WHMI.

Figure 4.3b. Acoustic monitor with notebook computer and sound level meter.

The acoustic monitor collected the following information:

1. Continuous sound levels (1-second L_{eq}, dBA). All 1-second L_{eq} data were date/time stamped by the notebook computer. From these 1-second L_{eq} data, all other acoustic metrics were calculated, such as hourly, daily, or seasonal L_{eq}, L_{90}, L_{50}, and L_{10}.
2. A 20-second digital recording (WAV file) of all sounds that exceeded a user defined threshold and duration was collected. The threshold dB and duration was determined after review of preliminary acoustic measurements and varied during the year.
3. Regular digital recordings were collected to identify and assess the percent time natural and non-natural sounds were audible. The acoustic monitor was programmed to record a 5-second digital recording every 5 minutes, 24 hours/day, throughout the measurement period.

4.4 Data Management

All one-second L_{eq} data and WAV files were date-time stamped by the notebook computer. All data were entered into a database with associated location data and date-time stamps. Data were downloaded using a portable hard drive. Once data were retrieved from the field, data were copied to a CD for permanent storage.

4.5 Monitor Location

Several locations were considered for placement of the acoustic monitor. Most locations in WHMI are influenced to some degree by sounds from the visitor center/museum or by sounds from park housing. The measurement location selected was at the south edge of WHMI site, south of the Mission location. There is a small section of native vegetation that prevented most visitors from seeing the monitor and this was considered a secure location. Although there is a small area on the north side of WHMI managed as a "natural" area, sound levels at this location are greatly influenced by highway traffic on Highway 12, approximately 475 meters north of WHMI. The site selected at the south edge of WHMI was less influenced by vehicle and park development sounds.

5.0 Results

5.1 Acoustic Metrics

5739 hours of acoustic data were collected between November 2001 and December 2002. Number of hours per month and season are presented in Table 5.1a. Sound levels (L_{eq}, L_{50}, and L_{90}, all A-weighted) by monthly median and seasonal mean are presented in Table 5.1b. The minimum sound level recorded was 17.9 dBA; however, this was near the instrument's noise floor and the actual minimum level was likely below this level. The maximum sound level was 90.4 dBA, a propeller aircraft.

Table 5.1a. Hours of data collected by hours per month, summer and winter, WHMI, 2001-2002.

Summer Hours/Month	
Apr	0
May	537
Jun	720
Jul	742
Aug	743
Sep	719
Total:	3461

Winter Hours/Month:	
Oct	744
Nov	720
Dec	385
Jan	0
Feb	429
Mar	0
Total:	2278

Table 5.1b. Monthly median and seasonal mean sound levels (dBA) for summer and winter, WHMI, 2001-2002.

Summer			
Month	**Leq**	**L50**	**L90**
Apr			
May	45.2	39.1	34.4
Jun	45.2	40.4	35.1
Jul	43.6	38.7	33.7
Aug	42.8	38.7	34.1
Sep	43.1	39.0	34.1
Mean:	44.0	39.2	34.3

Winter			
Month	**Leq**	**L50**	**L90**
Oct	40.8	36.8	32.1
Nov	38.2	34.8	30.7
Dec	35.3	31.5	27.6
Jan			
Feb	43.6	38.7	34.8
Mar			
Mean:	39.5	35.4	31.3

Detailed monthly acoustic data, by hour, are presented in Appendix II. Because acoustic metrics have been computed differently in past NPS studies, several computed metrics are presented, including hourly logarithmic mean L_{eq}, arithmetic mean L_{eq}, median L_{eq}, median L_{10}, median L_{50}, median L_{90}, and minimum and maximum sound levels. The median value is the most appropriate measure and best representation of central tendencies for these data.

5.2 Audible Sound Sources

Sound source identification and assessment of percent time audible are accomplished either by observer logging at the site or listening to playback of recorded data. Both are labor-intensive and thus only sample periods are used to calculate these metrics. At WHMI, summer periods studied for source identification and audibility were May 23-29, 2002 (154 hours) and July 14-20, 2002 (168 hours), a total of 322 hours. Winter periods

studied were November 4-11, 2001 (168 hours), and February 7-16, 2002 (153 hours), a total of 321 hours. In summer, non-natural sounds were audible, on average, for 66.0 percent of the time; in winter, 51.5 percent of the time. Identification of audible sound sources and percent time sources were audible for summer and winter are presented in Tables 5.2a-5.2b and Figures 5.2a-5.2b. The percent time non-natural sounds were audible for winter are presented in Tables 5.2c-5.2d and Figures 5.2c-5.2d. It should be noted that the "Percent Time Audible" values for the individual sources, when summed, will be greater than 100 percent. This is because several different sounds can be heard at the same time, thus the sum of all can be greater than 100 percent.

Table 5.2a. Identification of audible sound sources and percent time sources were audible, WHMI, May and July, 2002.

Audible Sound Source	**Average Percent Time Audible**		**Mean**
	May 2002	July 2002	
None	6.9%	1.0%	4.0%
Unknown	0.2%	0.8%	0.5%
Jet aircraft	2.2%	2.0%	2.1%
Propeller aircraft	6.0%	3.8%	4.9%
Helicopter	0.2%	0.0%	0.1%
Vehicle	25.5%	30.3%	27.9%
People	6.1%	3.0%	4.6%
Domestic animal	3.0%	2.6%	2.8%
Train	0.1%	0.2%	0.1%
Unknown motor noise	6.2%	9.1%	7.6%
Lawn mower/blower/trimmer	8.5%	6.2%	7.3%
Human-caused, unknown	0.1%	21.5%	10.8%
Wind	3.8%	17.9%	10.8%
Rain	6.5%	0.2%	3.3%
Bird	65.4%	49.1%	57.2%
Animal	5.1%	13.1%	9.1%
Insect	2.8%	1.6%	2.2%
Natural, unknown	1.9%	0.4%	1.1%

Audible Sound Source Summary			
Natural	83.6%	81.8%	82.7%
Human-caused	57.6%	78.6%	68.1%
None	6.9%	1.0%	4.0%
Unknown	2.1%	1.2%	1.7%

Table 5.2b. Percent time human-caused sounds were audible by hour, WHMI, May and July, 2002.

Hour	Percent Time Human-caused Sounds Audible		Mean
	May 2002	July 2002	
0:00	46.4%	84.5%	65.5%
1:00	44.1%	86.9%	65.5%
2:00	46.4%	78.6%	62.5%
3:00	36.9%	81.0%	58.9%
4:00	46.4%	69.1%	57.7%
5:00	53.6%	71.4%	62.5%
6:00	75.0%	88.1%	81.6%
7:00	71.7%	89.3%	80.5%
8:00	59.5%	67.9%	63.7%
9:00	62.5%	72.6%	67.6%
10:00	76.2%	77.4%	76.8%
11:00	79.8%	67.9%	73.8%
12:00	81.0%	69.1%	75.0%
13:00	71.4%	59.5%	65.5%
14:00	59.5%	51.2%	55.4%
15:00	52.4%	57.1%	54.8%
16:00	64.3%	61.9%	63.1%
17:00	60.7%	61.9%	61.3%
18:00	36.7%	70.2%	53.5%
19:00	47.2%	79.8%	63.5%
20:00	56.7%	79.8%	68.2%
21:00	50.0%	83.3%	66.7%
22:00	53.6%	92.9%	73.2%
23:00	46.4%	89.3%	67.9%
Mean			66.0%

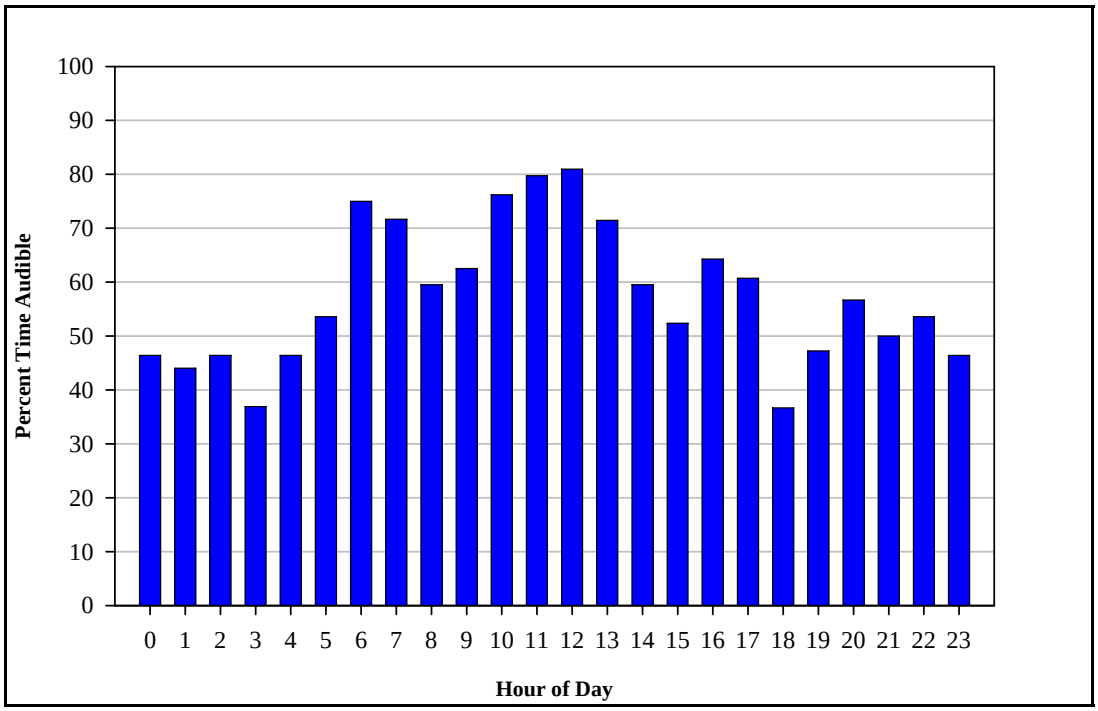

Figure 5.2a. Average percent time human-caused sounds were audible at WHMI, May 23-29, 2002.

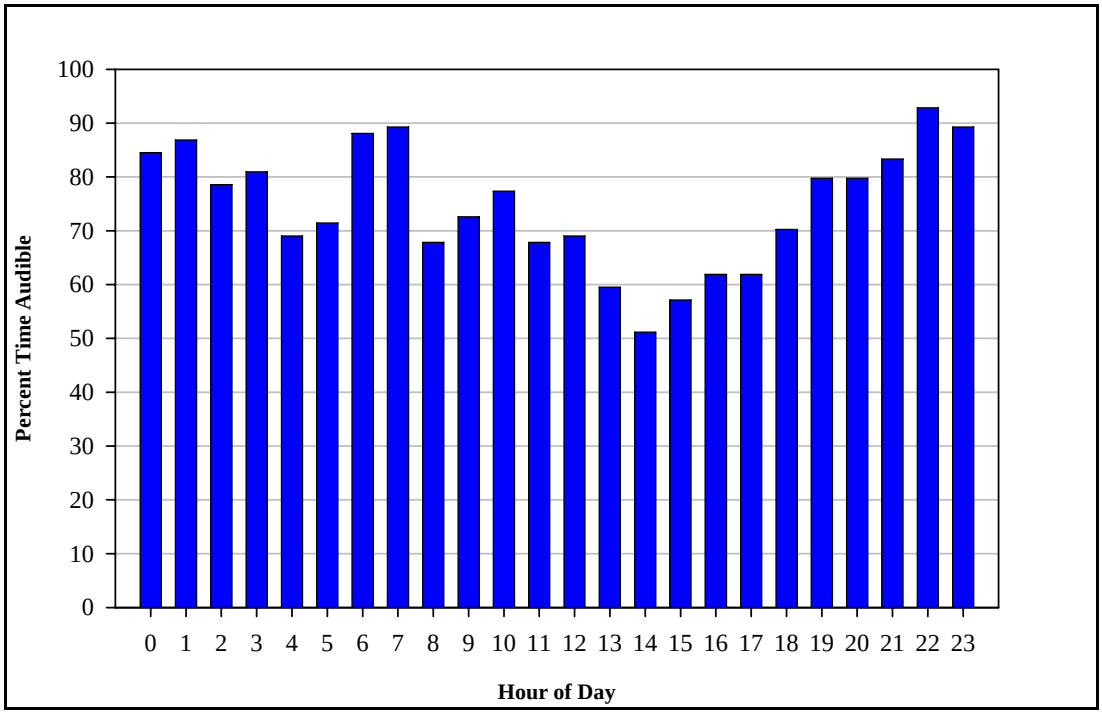

Figure 5.2b. Average percent time human-caused sounds were audible at WHMI, July 14-20, 2002.

Table 5.2c. Identification of audible sound sources and percent time sources were audible, WHMI, November 2001 and February 2002.

Audible Sound Source	Average Percent Time Audible		Mean
	Nov. 2001	Feb. 2002	
None	11.9%	18.9%	15.4%
Unknown	1.5%	0.6%	1.0%
Jet aircraft	1.3%	1.5%	1.4%
Propeller aircraft	1.6%	4.8%	3.2%
Helicopter	0.0%	0.2%	0.1%
Vehicle	36.0%	0.2%	18.1%
People	0.6%	31.9%	16.2%
Domestic animal	11.3%	0.7%	6.0%
Train	0.6%	6.1%	3.4%
Unknown motor noise	2.9%	0.8%	1.9%
Lawn mower/blower/trimmer	3.2%	3.1%	3.2%
Human-caused, other	0.1%	0.1%	0.1%
Human-caused, unknown	0.1%	0.6%	0.3%
Wind	3.2%	18.4%	10.8%
Rain	35.2%	8.4%	21.8%
Bird	16.8%	38.3%	27.6%
Animal	1.2%	0.8%	1.0%
Natural, unknown	3.7%	0.7%	2.2%

Audibility Summary			
Natural	56.4%	65.9%	61.1%
Human-caused	57.6%	49.8%	53.7%
None	11.9%	18.9%	15.4%
Unknown	5.3%	1.2%	3.3%

Table 5.2d. Percent time human-caused sounds were audible by hour, WHMI, November 2001 and February 2002.

Hour	Percent Time Human-caused Sounds Audible		Mean
	Nov. 2001	Feb. 2002	
0:00	41.7%	31.0%	36.3%
1:00	46.4%	21.7%	34.1%
2:00	48.8%	29.8%	39.3%
3:00	58.3%	25.0%	41.7%
4:00	67.9%	36.1%	52.0%
5:00	77.4%	52.8%	65.1%
6:00	78.6%	42.9%	60.7%
7:00	73.8%	60.7%	67.3%
8:00	79.8%	62.5%	71.1%
9:00	47.6%	65.5%	56.6%
10:00	45.2%	51.2%	48.2%
11:00	41.7%	53.6%	47.6%
12:00	44.1%	48.8%	46.4%
13:00	40.5%	51.2%	45.8%
14:00	50.0%	73.8%	61.9%
15:00	60.7%	58.3%	59.5%
16:00	52.4%	66.7%	59.5%
17:00	40.5%	72.6%	56.6%
18:00	52.4%	55.6%	54.0%
19:00	56.0%	47.2%	51.6%
20:00	60.7%	63.9%	62.3%
21:00	52.4%	48.3%	50.4%
22:00	35.7%	38.3%	37.0%
23:00	35.7%	28.3%	32.0%
Mean			51.5%

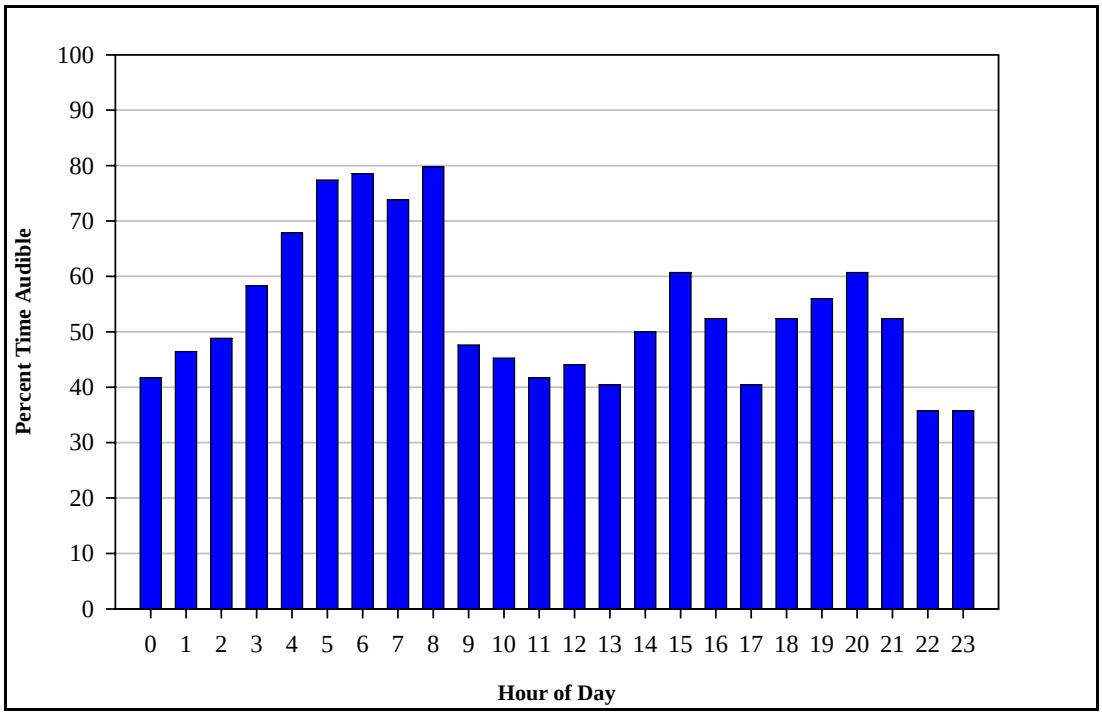

Figure 5.2c. Average percent time human-caused sounds were audible at WHMI, November 4-10, 2001.

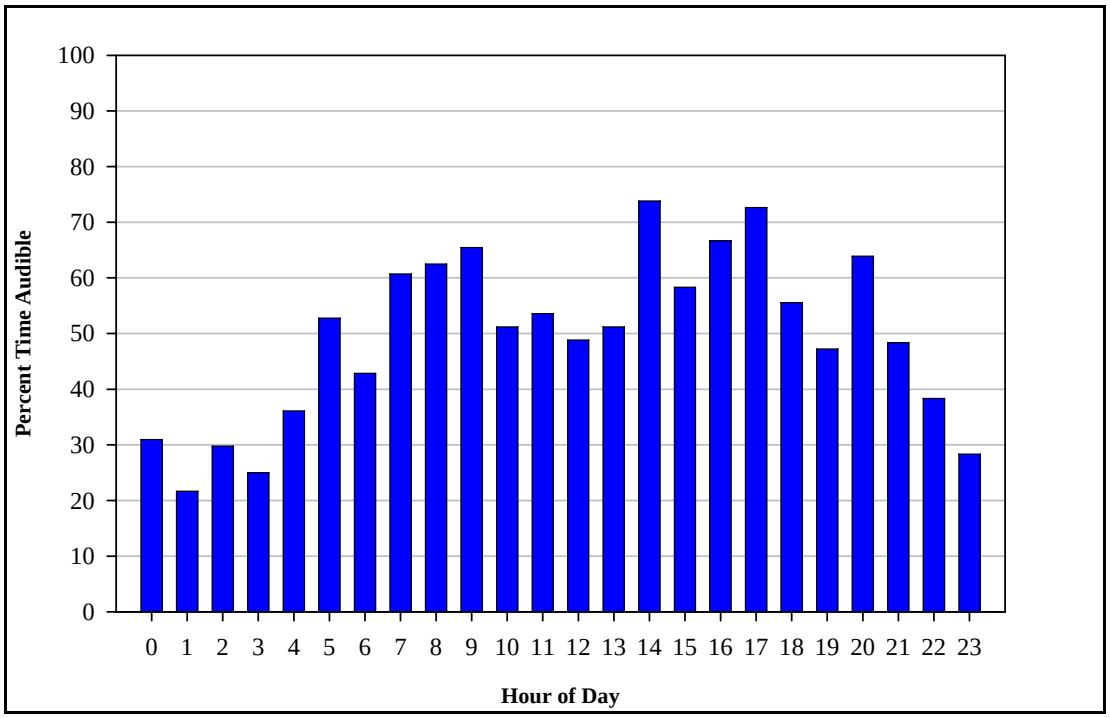

Figure 5.2d. Average percent time human-caused sounds were audible at WHMI, February 7-13, 2002.

5.3 Sounds >65 dBA and >10 Seconds

615 individual sound events exceeded 65 dBA for 10 seconds or more between November 2001 and December 2002 (Table 5.3; Appendix III). Grounds care equipment (lawn mowers, leaf blowers, weed trimmers, water pumps) were the most common source of sounds >65 dBA and >10 seconds (82 percent of all events). The loudest human-caused event was a propeller aircraft (90.4 dBA) and the loudest natural event was wind in vegetation (80.7 dBA; this was actual wind in vegetation sounds, and not a wind-windscreen-microphone interaction sound).

Table 5.3. Sound events >65 dBA and >10 seconds, WHMI, November 2001 to December 2002.

Source of Event	Number of Events
Aircraft, Jet	1
Aircraft, Propeller	57
Helicopter	3
Lawn Maintenance Equipment	502
Thunder	5
Rain	3
Wind	44
Total Events	**615**

Loudest Events	dBA
Human-caused: Aircraft, Propeller	90.4 dBA
Natural: Wind	80.7 dBA

6.0 Discussion

Non-natural sounds were audible at WHMI, on average, more than 50 percent of the time (for some hours, more than 75 percent of the time). Thus, non-natural sounds had a large influence on measured and calculated metrics. Acoustic conditions at WHMI were relatively stable, with L_{eq}, L_{50}, and L_{90} values being fairly close to one another. When L_{eq} values are reasonably close to L_{50} (<5 dBA difference), this suggests relatively few very loud events (events considerably louder than the existing sound levels). Likewise, when L_{50} and L_{90} values are reasonably close (<5 dBA difference), this suggests relatively stable acoustic conditions. Sound levels were slightly higher in summer, but there was relatively little seasonal variability (L_{eq} averaged 4.5 dBA higher in summer and L_{90} averaged 3.0 dBA higher in summer). In a natural setting, greater seasonal variability is common (unpublished data, Natural Sounds Program, NPS); however, the nearly

consistent, year-round influence of non-natural sounds at WHMI likely reduces seasonal variability in sound levels.

The purposes of Whitman Mission National Historic Site (NPS 2000) are to:

- Preserve and maintain the site of the Mission and school for Indians established by Marcus and Narcissa Whitman between 1836-1847 along the Walla Walla River at Waiilatpu, and to preserve and maintain the memorials to their lives; and

- Relate for the public the events that took place at the Mission site and its role in western migration and settlement along the Oregon Trail.

Park staff use outdoor interpretative programs, special educational programs, and self-guided tours to relate to the public the events that took place at WHMI. These activities cannot be successful if non-natural sounds interfere significantly with interpretative programs.

Sound level of normal conversation at 1 meter is about 55 dBA (Berglund and Lindvall 1995). For 100 percent sentence intelligibility, speech sound levels need to exceed background sound levels by 15-18 dBA (ISO 1988). When background sound levels are equal to speech sound levels, intelligibility falls to 95 percent (Berglund and Lindvall 1995). At WHMI, existing ambient sound levels (both natural and non-natural sounds) generally average between 35 to 40 dBA. Non-natural sounds frequently exceed these levels, and when such conditions occur, the ability of park staff to provide outdoor interpretive programs is reduced. Sound levels, particularly those produced by sources that have the potential to impact interpretive programs, should be monitored at WHMI.

7.0 Recommendations

Whitman Mission National Historic Site is in a semi-rural area, surrounding by lands currently used primarily for agriculture. Most of the human-caused sounds at the site are associated with NPS operations or activities on adjoining lands. WHMI has taken the initial steps to characterize the soundscape at the site. Future soundscape work should include efforts to continue to monitor the soundscape, identify sources of sounds that have the potential to or already are interfering with the park's purposes, and initiate efforts to eliminate or minimize activities that create sounds that interfere with park purposes. The following are recommended:

- Initiate preparation of a soundscape management plan for WHMI.

- Initiate management practices to minimize NPS impacts to the soundscape at WHMI, principally replacement of NPS grounds care equipment, the primary sources of loud sounds at WHMI. Scheduled replacement of existing equipment or purchase of new equipment should include consideration and high emphasis on minimal sound levels.

- Work with neighboring land owners and managers to minimize impacts to the WHMI soundscape.

- Initiate an annual program to monitor sound levels and identify sources of sounds at WHMI to assess progress in achieving soundscape management objectives as identified in a WHMI Soundscape Management Plan.

8.0 Acknowledgements

Roger Trick, WHMI, initiated this project and was very helpful throughout the study. Mr. Trick, Ric Hupalo, and Shan Burson, reviewed earlier drafts of this report and made several suggestions that improved the report. We greatly appreciate their help.

9.0 Literature Cited

Americans Standards Institute (ANSI). 1992. Quantities and procedures for description and measurement of environmental sound. Part 2: Measurement of long-term, wide-area sound. Accredited Standards Committee S12, Noise. Acoustical Society of America, New York, NY. 12 pp.

Berglund, B., & Lindvall, T. (Eds.). 1995. Community noise. Archives of the Center for Sensory Research, 1995, 2(1), 1-195.

Fleming, G., C. J. Roof, and D. R. Read. 1998. Draft guidelines for the measurement and assessment of low-level ambient noise (DTS-34-FA865-LR1). U. S. Department of Transportation, Federal Aviation Administration, John A. Volpe National Transportation Systems Center, Acoustics Facility, Cambridge, MA. 83 pp.

ISO. 1988. Ergonomics–Assessing the effects of noise on speech communication at worker's position. Part 1: Speech interference level and communication distances for persons with normal hearing capacity in direct communication (SIL-method). Geneva, Switzerland: International Organization for Standardization, ISO DP9921.

National Park Service. 2000. General Management Plan for Whitman Mission National Historic Site. U. S. Department of Interior, National Park Service, Walla Walla, WA.

National Park Service. 2001. Management Policies 2001. U. S. Department of Interior, National Park Service, Washington, D. C.

Personnel Communication:

Dr. Hari Iyer, Associate Professor, Colorado State University, Fort Collins, CO.

Appendix I. Glossary of Acoustic Terms (Draft January 2005)

A-Weighting
See "Weighting."

Acoustics. The science of sound.

Acoustic Zone
Areas with similar vegetation, terrain, animals, and weather likely have similar acoustic characteristics, including sound sources and sound attenuation characteristics. These areas are referred to as "acoustic zones" and may be helpful in describing acoustic conditions in areas with similar characteristics.

Ambient Sound Conditions
Many different soundscapes occur in national parks. In some areas, natural sounds predominate, while in others, both natural and non-natural sounds occur. In order to understand and management soundscapes, ambient conditions for different soundscapes need to be acoustically described. Definitions of common ambient sound conditions are provided below.

> **Ambient Sound, Existing**.
> All sounds in a given area (includes all natural and non-natural sounds). The Volpe Center has used the term "Existing" to describe existing ambient sound conditions.
>
> **Ambient Sound, Natural**.
> All natural sounds in a given area, excluding all non-natural sounds. The sounds of people walking and talking at normal levels (55-60 dBA at 3 feet) is considered natural; mechanical, electrical, aircraft, vehicle, generator, radio, etc., sounds are considered non-natural. Natural ambient sound is considered synonymous with the term "natural quiet," although natural ambient sound is more appropriate because nature is often not quiet.

Amplitude
The instantaneous magnitude of an oscillating quantity such as sound pressure. The peak amplitude is the maximum value.

Attenuation
The reduction of sound intensity by various means (e.g., air, humidity and porous materials).

Area of Audibility
The area within which a specific sound or sounds is audible.

Audibility
Audibility is the ability of animals with normal hearing, including humans, to hear a given sound. Audibility is affected by the hearing ability of the animal, other simultaneous interfering sounds or stimuli, and by the frequency content and amplitude of the sound.

Audiogram
A graph showing hearing acuity as a function of frequency and amplitude.

Decibel
A logarithmic measure of any measured physical quantity and commonly used in the measurement of sound. The decibel provides the possibility of representing a large span of signal levels in a simple manner as opposed to using the basic unit Pascal. The difference between the sound pressure for silence versus a loud sound is a factor of 1,000,000:1 or more, therefore it is less cumbersome to use a small range of equivalent values: 0 to 130 decibels.

Doubling of Sound Pressure = 6 dB
Doubling of Sound Power = 3 dB
Doubling of Perceived Sound Level = 10 dB (approximately)

Doppler Effect (or Shift)
The apparent upward shift in frequency of a sound as the source approaches the receiver or the apparent downward shift when the source recedes.

Energy Equivalent Sound Level (L_{eq})
The level of a constant sound over a specific time period that has the same sound energy as the actual (unsteady) sound over the same period. In park situations, L_{eq} is useful for quantifying intruding sounds because its magnitude depends heavily on the loudest periods of a time-varying sound. L_{eq} of an intruding source by itself, however, is inadequate for fully characterizing the intrusiveness of the source. Research has shown that judgments of the effects of intrusions in park environments depend not only upon the amplitude of the intrusion, but also upon the sound level of the "background," in this case, the sound level of the non-intruding sources, usually the natural ambient sound levels. L_{eq} must be used carefully in quantifying natural ambient sound levels because occasional loud sound levels (gusts of wind, birds, insects) may heavily influence (increase) its value, even though the sound levels are typically lower.

Events per Hour
The number of times a non-natural sound source is heard, on average, in one hour (this may be specific to a particular human-caused sound or to all human-caused sounds). If this information is known, presentation and documentation provides another easily comprehended measure of how often the particular intruding sounds are heard. It provides an additional means for communicating the sense of the soundscape.

Frequency
The number of times per second that the sine wave of sound repeats itself. It can be expressed in cycles per second, or Hertz (Hz). Frequency equals Speed of Sound / Wavelength.

Hearing Range (human)
An average healthy young person can hear frequencies from approximately 20 Hz to 20000 Hz, and sound pressure levels from 0 dB to 130 dB or more (threshold of pain). The smallest perceptible change is 1 dB.

Human-caused Sound
Any sound that that is attributable to a human source. This term may be used interchangeably with "non-natural," "human-made," "man-caused," or "man-made" sound.

Infrasound
Frequencies below 20 Hz. Humans perceive frequencies below about 20 Hz as pressure rather than sound.

Intensity
The sound energy flow through a unit area in a unit time.

Loudness
The subjective judgment of intensity of a sound by humans. Loudness depends upon the sound pressure and frequency of the stimulus. Loudness was defined by Fletcher and Munson (1933) as a physiological description of the magnitude of an auditory sensation. The definition of loudness was later refined as a definition of the attribute of auditory sensation corresponding most closely to the physical measurement of sound intensity, but is not always accurate.

Masking
The process by which the threshold of audibility for a sound is raised by the presence of another (masking) sound. A masking sound is one that renders inaudible or unintelligible another sound that is also present.

Noise
Traditionally, noise has been defined as unwanted, undesired, or unpleasant sound. This makes noise a subjective term. Sounds that may be unwanted and undesired by some may be wanted and desirable by others. Sound is sound, as defined in this document: a pressure variation, etc. In order to keep terms used in soundscape management as non-subjective as possible, sounds should be classified as either appropriate or inappropriate, rather than as "noise." or "sound." The appropriateness of any sound in a given area of a park will depend on a variety of factors, including the management objectives of that area.

Noise Floor
The lowest amplitude measurable by sound monitoring equipment. Most commercially available sound level meters and microphones can detect sound levels down to about 15 to 20 dBA; however, there are microphones capable of measuring sound levels below 0 dBA.

Noise-Free Interval
The length of time during which only natural sounds are audible.

Octave
The interval between two frequencies having a ratio of 2 to 1. For acoustic measurements, the octaves start a 1000 Hz center frequency and go up or down from that point, at the 2:1 ratio. From 1000 Hz, the next filter's center frequency is 2000 Hz, the next is 4000 Hz, etc., or 500 Hz, 250 Hz, etc. Octave filtering is usually referred to as the class of octave filters typically 1, 3 or 12, thus creating full octaves, one-third octaves, or one-twelve octaves.

Octave Band
The segment of the frequency spectrum centered on an octave center frequency bounded by the midpoint between the next lower and higher octave.

Octave Band, One-Third
A frequency band whose cutoff frequencies have a ratio of 2 to the one-third (approximately 1.26). One-third octave bands reflect reasonably the ability of humans to differentiate tones.

Percent Exceedence (L_x)
These metrics are the sound levels (L), in decibels, exceeded *x* percent of the time. The L_{50} value represents the sound level exceed 50 percent of the measurement period. L_{50} is the same as the median. The L_{90} value represents the sound level exceeded 90 percent of the time during the measurement period. L_{50} and L_{90} are useful measures of the natural sounds because in park situations, away from developed areas, they are less likely to be affected by human-caused sounds. Put another way, human-caused sounds in many park areas are likely to affect the measured sound levels for less than 50% of the time, and almost certainly for less than 90% of the time. L_{50} is used when there is high probability that no human-caused sounds affect the measurements. L_{90} is used when human-produced sounds are present much of the time during measurements. Common sounds that could be present for more than 50% of the time include road traffic sounds and, in some areas, high altitude jet aircraft.

Signal-to-Noise Ratio (SNR)
The ratio between the aplitude of a signal (meaningful information) and the aplitude of background noise. Because many signals have a very wide dynamic range, SNRs are often expressed in terms of the logarithmic decibel scale.

Spectrum (Frequency Spectrum)
The amplitude of sound at various frequencies. It is given by a set of numbers that describe the amplitude at each frequency or band of frequencies.

Sound
A wave motion in air, water, or other media. It is the rapid oscillatory compressional changes in a medium that propagate to distant points. It is characterized by changes in density, pressure, motion, and temperature as well as other physical properties. Not all rapid changes in the medium are sound (wind distortion on a microphone diaphragm).

Soundscape
Soundscape refers to the total acoustic environment associated with a given area. In a national park setting, soundscapes can be composed primarily of natural sounds, or it can be composed of both natural and non-natural sounds.

Sound Exposure Level (SEL)
The total sound energy of an actual sound calculated for a specific time period. SEL is usually expressed using a time period of one second. This metric is useful in comparing two sounds that differ is amplitude and duration. A very long, very low level sound may have the same 1-second SEL as a very short, very loud sound.

Sound Level
Generally, sound level refers to the *weighted* sound pressure level obtained by frequency weighting, usually A- or C-weighted.

Sound Power (W)
The total sound energy radiated by a source per unit time. The unit of measurement is the Watt.

Sound Power Level (L_W)
The acoustic power radiated from a given sound source as related to a reference power level (typically 10^{-12} watts) and expressed as decibels. A sound power level of 1 watt = 120 dB (reference level = 10^{-12} watts).

Sound Pressure
Fluctuations in air pressure caused by the presence of sound waves. Sound pressure is the instantaneous difference between the actual pressure produced by a sound wave and the average barometric pressure at a given point in space. Not all pressure fluctuations detected by a microphone are sound (e.g., wind over the microphone). Sound pressure is measured in Pascals (Pa), Newtons per square meter, which is the metric equivalent of pounds per square inch.

Sound Pressure Level (SPL)
The logarithmic form of sound pressure. In air, 20 times the logarithm (to the base 10) of the ratio of the actual sound pressure to a reference sound pressure (which is 20

micropascals, and by convention has been selected to be equal to the assumed threshold of human hearing). It is also expressed by attachment of the word decibel to the number.

Sound Speed
The speed of sound in air is about 344 m/sec (1,130 ft/sec or 770 mph) at 70^{o} F at sea level. It substantially varies depending on temperature and type of medium.

Time Above Natural Ambient
The amount of time that sound levels from non-natural sounds are greater than sound levels of natural sound levels. This measure is not specific to the hearing ability of a given animal, but rather a measure of when and how long non-natural sound levels exceed natural ambient sound levels.

Time Audible
The amount of time that various sound sources are audible to animals, including humans, with normal hearing (hearing ability varies among animals). This information is essential for measuring and monitoring human-caused sound in national parks. These data can be collected by either a trained observer (attended logging) or by making high-quality digital recordings (for later playback). Percent Time Audible is useful because it is a measure that is understandable without any acoustics knowledge. It is a measure that can be specific to a given animal, and it is a metric that correlates well with park visitor judgments of annoyance and with visitor reports of interference from certain sound sources with the sounds of nature

Time Response
The response speed of the detector in a sound level meter. For Slow response, the response speed is 1 second. Slow time response is frequently used in environmental sound measurements. Fast response time is 1/8 second (0.125). This is less frequently used, but will detect changes in sound levels more rapidly. Both Fast and Slow time response have been used in previous NPS acoustic studies, and, when compared over long measurement periods (over several days), there is very little difference in results (differences are often less than the accuracy of the meter). Fast and slow time response were developed, in part, to slow needle movement in analog meters so investigators could read and record sound levels. This added a "decay" factor in decibel data. New digital sound level meters, while changing numbers rapidly on the screen, store sound level data in memory for later analysis, thus, the ability to read numbers on the screen is less important. Hence, the most accurate acoustic data are collected without a response speed (fast or slow). For most environmental acoustic studies, data are collected at 1-second intervals (more frequent data may be needed in some studies).

Ultrasound
Sounds of a frequency higher than 20,000 Hz.

Wave
A particular type of disturbance that travels through a medium by virtue of the elastic properties of that medium.

Wavelength
Wavelength is the distance a wave travels in the time it takes to complete one cycle. A wavelength can be measured between successive peaks or between any two corresponding points on the cycle. Wavelength (ft) = Speed of Sound (ft) / Frequency (Hz).

Weighting
Adjustment of sound level data to achieve a desired measurement. A-Weighting is used to account for changes in human hearing sensitivity as a function of frequency. The A-weighting network de-emphasizes the high (6.3 kHz and above) and low (below 1 kHz) frequencies, and emphasizes the frequencies between 1 kHz and 6.3 kHz, in an effort to simulate the relative response of human hearing. C-Weighting is linear over the mid frequency range from 200 Hz to 1.6 kHz, and de-emphasizes the low (below 200 Hz) and high (above 1.6 kHz) frequencies.

Windscreen
A porous device used to cover the microphone of a sound level measurement system. Windscreens are designed to minimize the effects of wind disturbance on the sound levels being measured while minimizing the attenuation (<0.5 dB) of the signal. When using windscreens that attenuate sound levels >0.5 dB, the amount of attenuation for each one-third octave band must be known and corrections applied.

These definitions were derived from several sources, primarily:

Acoustic Alliance. 2001. Glossary of Terms, Acoustic Alliance Products and Services Catalog. Provo, UT.

American National Standards Institute. 1976. Standard Acoustical Terminology, S1.1. American National Standards Institute, New York, NY. 1976.

Bruel & Kjaer. 2002. Environmental Sound. Bruel & Kjaer Sound and Vibration Measurement. Naerum, Denmark.

Everest, F. A. 2001. Master Handbook of Acoustics. McGraw-Hill, New York, NY.

Hirschorn, M. 2002. Sound Control Reference Handbook. Sound & Vibration, Bay Village, OH.

Kelso, D. and A. Perez. 1983. Sound Control Terms Made Somewhat Easier. Minnesota Pollution Control Agency, St. Paul, MN.

Appendix II. Monthly and hourly sound levels at Whitman National Historic Site, November 2001 to November 2002.

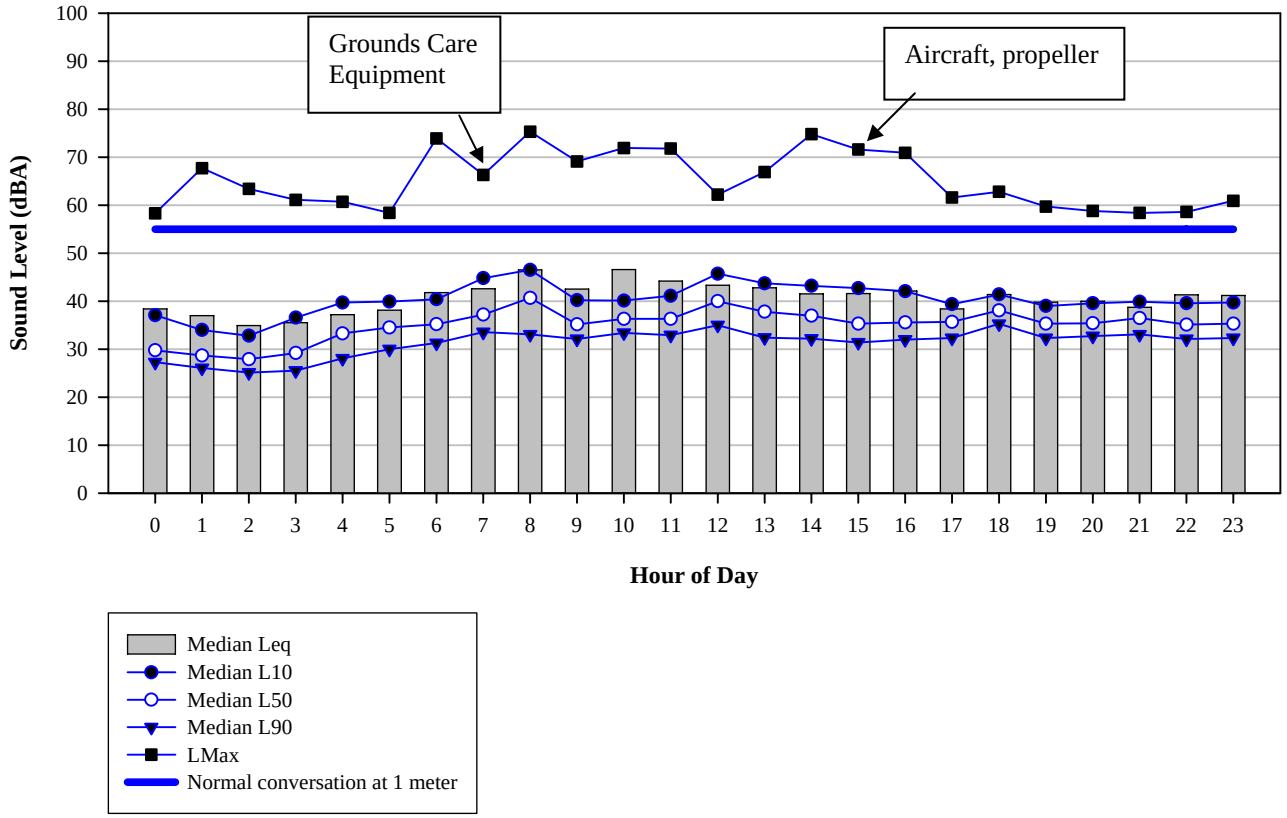

Figure II-1. Hourly sound levels (dBA), Whitman Mission National Historic Site, 11-3-2001 to 11-13-2001 (n=206).

Table II-1. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 11-03-2001 to 11-13-2001 (n=206).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	10	38.4	35.0	33.9	37.1	29.8	27.3	21.6	58.3
1	10	37.0	33.9	32.8	34.0	28.7	26.1	21.3	67.7
2	10	34.9	32.2	31.5	32.8	27.9	25.1	21.6	63.4
3	10	35.5	32.7	33.4	36.6	29.2	25.5	21.6	61.1
4	10	37.2	34.0	36.4	39.7	33.3	28.1	21.6	60.7
5	10	38.1	35.2	36.9	39.9	34.5	30.0	22.0	58.4
6	10	41.8	39.2	39.5	40.4	35.2	31.3	22.2	73.9
7	10	42.6	41.3	41.9	44.8	37.2	33.6	23.1	66.3
8	10	46.5	43.5	44.4	46.5	40.7	33.1	24.4	75.3
9	10	42.5	39.7	39.5	40.2	35.2	32.1	24.3	69.1
10	9	46.6	41.1	38.4	40.1	36.3	33.4	24.0	71.9
11	9	44.2	42.2	41.1	41.1	36.3	32.9	24.7	71.8
12	9	43.3	41.5	42.8	45.7	40.0	35.0	25.1	62.2
13	9	42.8	41.5	40.9	43.7	37.8	32.4	24.8	66.9
14	10	41.5	40.3	40.4	43.2	37.0	32.2	24.0	74.8
15	10	41.6	40.5	40.0	42.7	35.3	31.4	23.5	71.6
16	10	42.1	40.4	41.4	42.1	35.6	32.0	24.5	70.9
17	10	38.4	36.9	37.3	39.4	35.7	32.3	23.8	61.6
18	10	41.4	38.3	39.1	41.4	38.1	35.3	23.8	62.8
19	5	39.8	38.3	37.8	39.0	35.3	32.3	26.5	59.7
20	4	40.0	38.2	37.2	39.6	35.4	32.7	26.2	58.8
21	4	38.7	37.6	37.4	39.9	36.5	33.1	26.8	58.4
22	4	41.3	38.7	36.8	39.6	35.1	32.1	23.7	58.6
23	3	41.2	39.5	37.2	39.7	35.3	32.3	24.1	60.9
								Min=21.3	Max=75.3

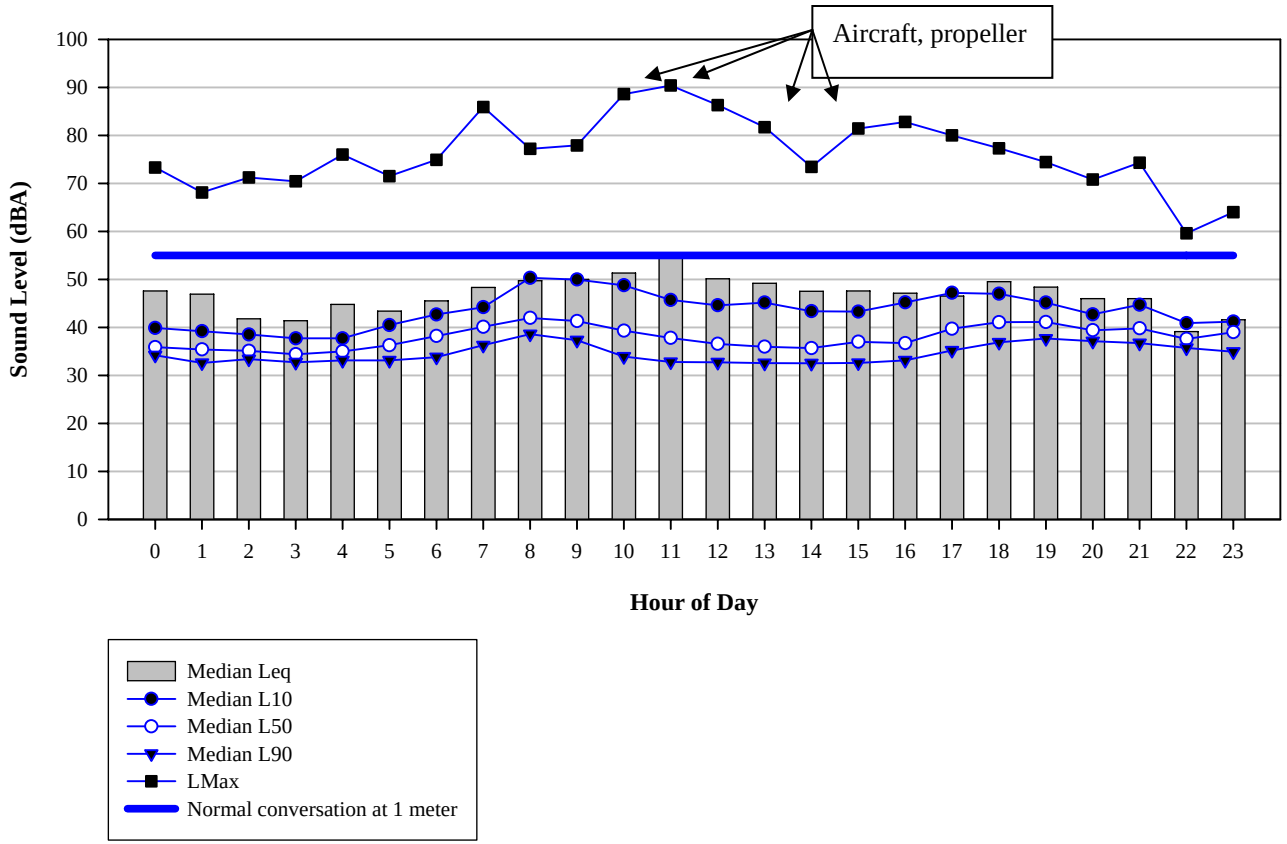

Figure II-2. Hourly sound levels (dBA), Whitman Mission National Historic Site, 2-06-2002 to 2-25-2002 (n=416).

Table II-2. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 2-06-2002 to 2-25-2002 (n=416).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	16	47.6	39.8	38.2	39.9	35.9	34.2	28.3	73.3
1	17	46.9	41.0	40.0	39.2	35.4	32.6	28.2	68.1
2	17	41.8	38.8	37.6	38.5	35.1	33.4	28.9	71.2
3	17	41.4	38.8	37.7	37.7	34.4	32.7	28.0	70.4
4	18	44.8	39.6	38.8	37.7	35.0	33.1	27.4	76.0
5	18	43.4	40.0	39.2	40.5	36.3	33.1	23.9	71.5
6	18	45.5	40.8	39.9	42.7	38.2	33.8	22.8	74.9
7	18	48.3	46.3	45.3	44.2	40.1	36.3	22.8	85.9
8	18	49.7	46.7	47.1	50.3	42.0	38.6	24.4	77.2
9	20	50.0	46.7	46.9	50.0	41.3	37.3	24.9	77.9
10	20	51.3	47.2	46.8	48.8	39.3	33.9	26.1	88.6
11	19	54.7	46.0	45.7	45.7	37.8	32.8	25.7	90.4
12	20	50.1	45.8	44.0	44.6	36.6	32.7	25.4	86.3
13	20	49.2	45.1	44.1	45.2	36.0	32.6	24.4	81.7
14	20	47.5	42.9	42.2	43.4	35.7	32.5	24.5	73.4
15	20	47.6	43.1	41.9	43.3	37.0	32.6	24.2	81.4
16	20	47.1	45.3	44.5	45.2	36.7	33.1	23.8	82.8
17	21	46.5	45.5	45.7	47.2	39.7	35.2	24.6	80.0
18	20	49.5	47.5	48.4	47.0	41.1	36.9	30.3	77.3
19	18	48.4	45.1	44.0	45.2	41.1	37.7	29.4	74.4
20	17	46.0	42.5	40.4	42.7	39.4	37.1	29.0	70.8
21	17	46.0	43.6	42.7	44.7	39.8	36.7	30.3	74.3
22	4	39.1	38.6	39.2	40.9	37.6	35.7	30.0	59.6
23	3	41.6	40.4	39.4	41.2	39.0	34.9	30.4	64.0
								Min=22.8	Max=90.4

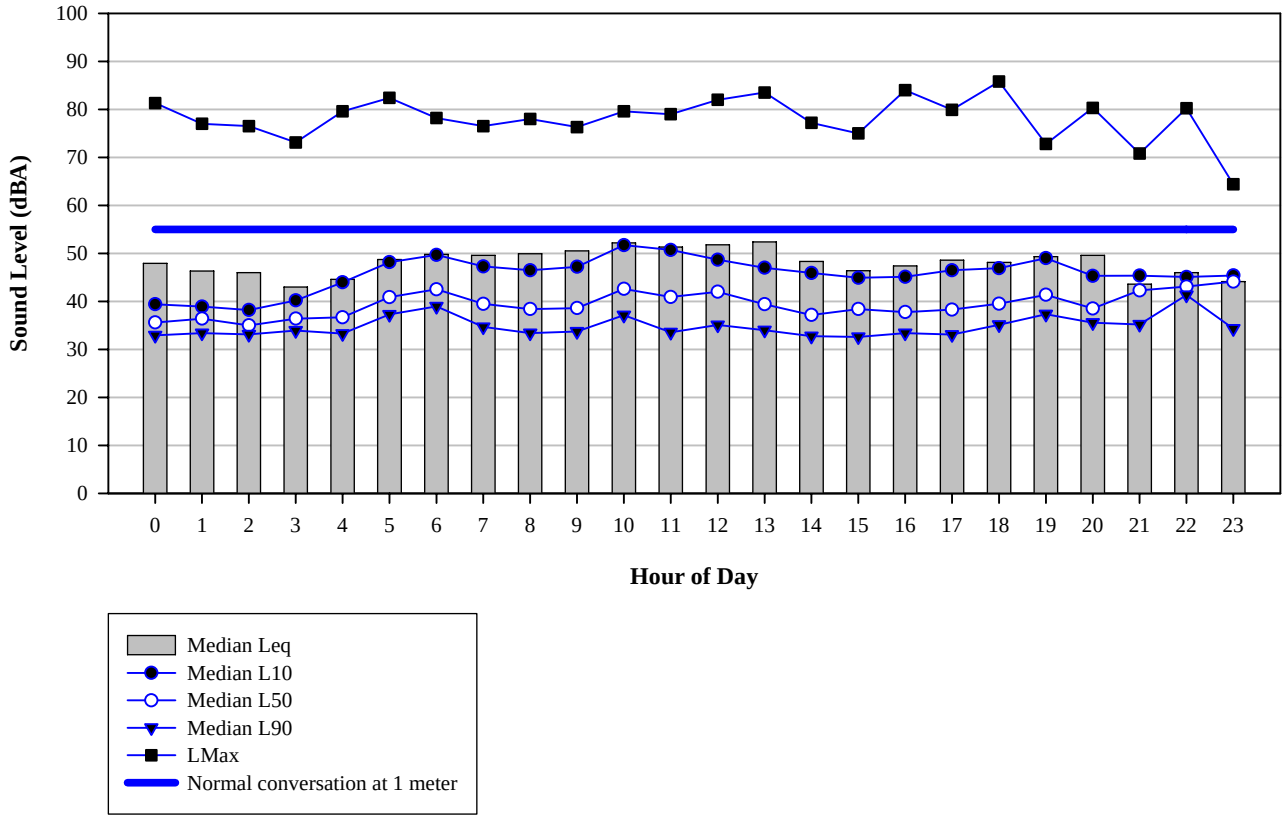

Figure II-3. Hourly sound levels (dBA), Whitman Mission National Historic Site, 5-05-2002 to 5-31-2002 (n=537).

Table II-3. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 5-05-2002 to 5-31-2002 (n=537).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	23	47.9	41.6	36.6	39.4	35.6	32.9	27.6	81.3
1	23	46.3	39.7	37.0	38.9	36.4	33.4	27.9	77.0
2	25	46.0	39.5	36.7	38.2	35.0	33.1	27.9	76.5
3	25	43.0	40.1	39.5	40.2	36.4	33.9	28.7	73.1
4	26	44.6	42.5	41.5	44.0	36.7	33.3	28.9	79.6
5	26	48.7	47.2	46.4	48.2	40.9	37.3	32.0	82.4
6	18	49.8	48.8	48.5	49.7	42.5	39.0	29.1	78.2
7	16	49.6	47.5	46.6	47.3	39.5	34.7	26.8	76.5
8	20	49.9	46.8	45.8	46.5	38.4	33.4	26.6	78.0
9	21	50.5	47.3	45.4	47.2	38.6	33.7	27.6	76.3
10	23	52.2	50.2	51.2	51.7	42.6	37.1	27.6	79.6
11	26	51.3	49.2	48.1	50.7	40.9	33.6	26.0	79.0
12	26	51.8	49.0	47.7	48.7	42.0	35.1	26.8	82.0
13	26	52.4	48.8	47.2	47.0	39.4	34.0	26.8	83.5
14	26	48.3	45.8	44.9	45.9	37.2	32.8	26.9	77.2
15	27	46.4	45.3	45.7	44.9	38.4	32.6	26.4	75.0
16	26	47.4	45.2	44.3	45.1	37.8	33.4	25.6	84.0
17	26	48.6	46.8	46.3	46.5	38.3	33.1	24.4	79.9
18	21	48.1	46.2	45.3	46.9	39.5	35.1	24.8	85.8
19	10	49.3	48.4	48.0	49.0	41.4	37.3	28.5	72.8
20	14	49.6	46.3	44.5	45.3	38.5	35.6	31.1	80.3
21	18	43.6	42.1	43.3	45.4	42.3	35.2	28.5	70.8
22	22	46.0	41.5	43.8	45.1	43.1	41.3	29.0	80.2
23	23	44.1	41.4	42.9	45.4	44.1	34.3	27.4	64.4
								Min=24.4	Max=85.8

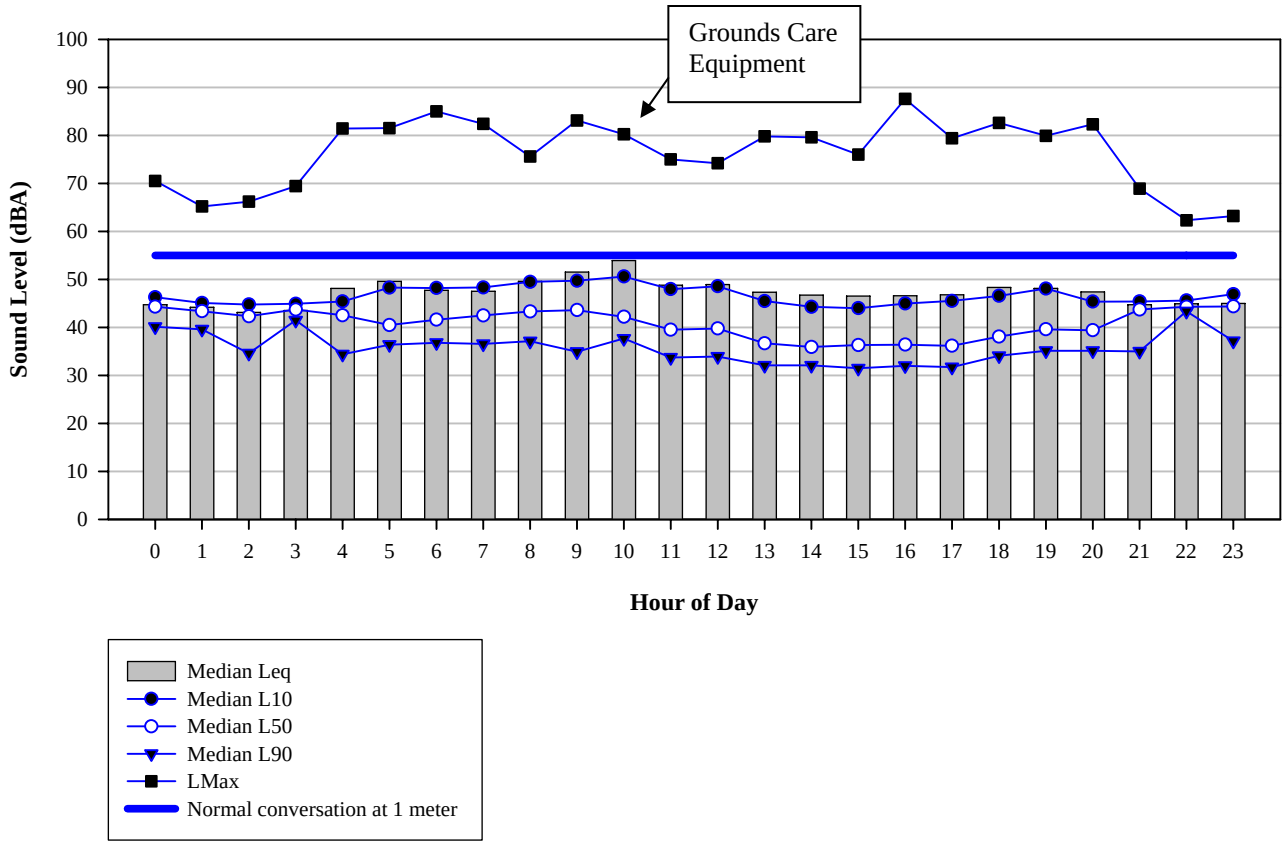

Figure II-4. Hourly sound levels (dBA), Whitman Mission National Historic Site (6-01-2002 to 6-30-2002).

Table II-4. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 6-01-2002 to 6-30-2002 (n=720).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	30	44.7	41.3	44.9	46.3	44.3	40.1	23.7	70.5
1	30	44.2	41.2	44.1	45.1	43.4	39.6	23.3	65.2
2	30	43.1	40.7	44.0	44.8	42.3	34.6	23.2	66.2
3	30	43.5	40.4	44.2	44.9	43.7	41.5	24.9	69.4
4	30	48.1	46.0	46.3	45.4	42.5	34.4	27.3	81.4
5	30	49.6	48.4	48.3	48.3	40.5	36.4	27.6	81.5
6	30	47.7	47.1	46.7	48.2	41.6	36.8	29.5	85.0
7	30	47.5	46.8	46.6	48.3	42.5	36.6	28.5	82.4
8	30	49.6	47.4	47.1	49.5	43.3	37.1	27.3	75.6
9	30	51.5	48.5	47.5	49.7	43.6	34.9	26.6	83.1
10	30	53.9	49.8	48.1	50.6	42.2	37.7	26.7	80.2
11	30	48.8	46.3	46.0	48.0	39.5	33.7	25.8	75.0
12	30	48.9	46.0	46.1	48.6	39.8	33.9	26.0	74.2
13	30	47.3	44.6	43.9	45.5	36.7	32.1	25.2	79.8
14	30	46.7	44.5	44.1	44.3	35.9	32.1	25.6	79.6
15	30	46.5	43.4	42.9	44.0	36.3	31.5	24.9	76.0
16	30	46.6	44.8	44.3	45.0	36.4	32.0	25.7	87.6
17	30	46.8	45.4	45.6	45.5	36.2	31.7	25.6	79.4
18	30	48.3	46.7	46.2	46.6	38.1	34.1	26.5	82.6
19	30	48.1	46.7	47.1	48.1	39.6	35.1	27.4	79.9
20	30	47.4	46.1	46.0	45.4	39.4	35.1	27.3	82.3
21	30	44.7	43.4	43.8	45.4	43.7	35.0	25.8	68.9
22	30	44.9	42.8	44.6	45.6	44.3	43.4	24.9	62.3
23	30	45.0	42.7	45.4	46.9	44.4	37.2	24.5	63.2
								Min=23.2	Max=87.6

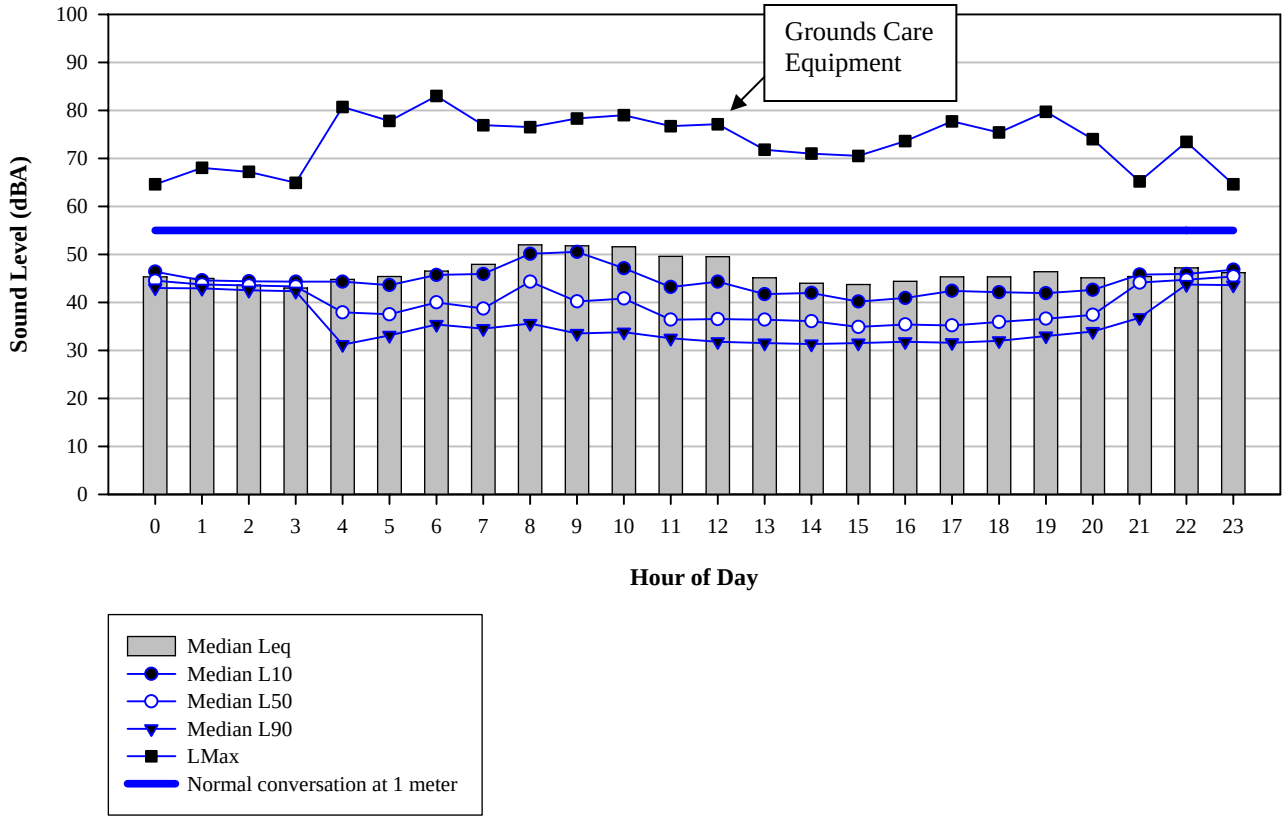

Figure II-5. Hourly sound levels (dBA), Whitman Mission National Historic Site (7-01-2002 to 7-31-2002).

Table II-5. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 7-01-2002 to 7-31-2002 (n=742).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	31	45.3	42.5	44.8	46.4	44.5	43.0	22.2	64.6
1	31	45.0	41.9	43.9	44.6	43.7	42.9	22.9	68.0
2	31	43.6	40.8	43.5	44.4	43.5	42.5	23.0	67.2
3	31	43.0	41.0	43.5	44.3	43.3	42.3	23.4	64.9
4	31	44.8	42.2	41.5	44.3	37.9	31.2	24.1	80.7
5	31	45.4	43.4	42.5	43.6	37.5	33.1	24.9	77.8
6	31	46.5	44.9	45.2	45.7	40.0	35.4	24.3	83.0
7	31	47.9	45.2	44.6	45.9	38.7	34.5	26.7	76.9
8	31	52.0	47.7	46.9	50.1	44.3	35.6	25.1	76.5
9	31	51.8	48.4	48.0	50.5	40.2	33.5	26.0	78.3
10	31	51.6	47.1	45.9	47.1	40.8	33.8	26.4	79.0
11	31	49.6	43.1	42.3	43.2	36.4	32.5	26.3	76.7
12	31	49.5	43.7	42.6	44.3	36.5	31.8	26.6	77.1
13	31	45.1	41.4	39.6	41.7	36.4	31.5	25.8	71.8
14	30	44.0	41.0	41.0	42.0	36.1	31.3	25.4	71.0
15	30	43.7	40.4	39.1	40.2	34.9	31.5	25.0	70.5
16	31	44.4	40.5	39.7	40.9	35.4	31.8	25.6	73.6
17	31	45.3	42.4	41.2	42.4	35.2	31.6	24.5	77.7
18	31	45.3	43.1	43.2	42.1	35.9	32.0	24.7	75.4
19	31	46.4	43.1	42.0	41.9	36.6	33.0	25.2	79.7
20	31	45.1	42.6	41.9	42.6	37.4	33.9	27.3	74.0
21	31	45.4	44.2	43.9	45.8	44.1	36.8	27.5	65.2
22	31	47.2	45.2	44.9	45.9	44.7	43.7	26.4	73.4
23	31	46.2	44.0	45.6	46.8	45.4	43.6	24.3	64.6
								Min=22.2	Max=83.0

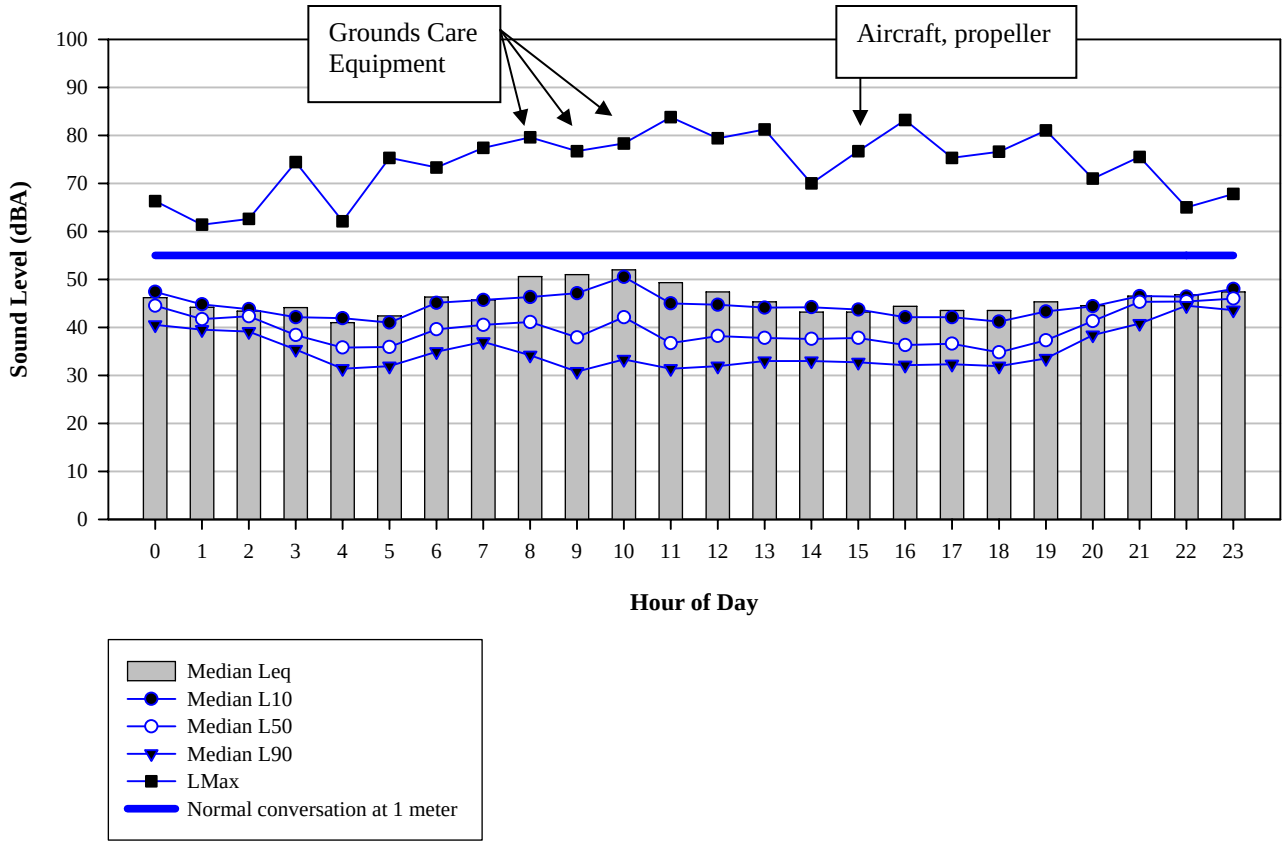

Figure II-6. Hourly sound levels (dBA), Whitman Mission National Historic Site (8-01-2002 to 8-31-2002).

Table II-6. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 8-01-2002 to 8-31-2002 (n=744).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	31	46.2	43.0	44.6	47.4	44.5	40.5	25.3	66.3
1	31	44.2	41.5	42.4	44.8	41.7	39.5	23.7	61.4
2	31	43.4	41.0	42.5	43.8	42.3	39.1	24.5	62.6
3	31	44.1	40.4	40.1	42.1	38.4	35.4	23.4	74.4
4	31	41.0	39.1	38.8	41.9	35.8	31.4	23.1	62.1
5	31	42.4	40.1	38.8	41.0	35.9	31.9	24.3	75.3
6	31	46.3	44.2	44.2	45.1	39.6	34.9	26.4	73.3
7	31	45.7	44.2	45.1	45.7	40.5	37.0	25.8	77.4
8	31	50.6	46.4	46.0	46.3	41.1	34.2	23.8	79.6
9	31	51.0	45.7	47.2	47.1	37.9	30.8	24.7	76.7
10	31	52.0	47.1	47.0	50.5	42.1	33.3	24.5	78.3
11	31	49.3	44.3	43.8	45.0	36.7	31.4	24.4	83.8
12	31	47.4	43.5	43.2	44.7	38.2	31.9	25.6	79.4
13	31	45.3	42.2	41.5	44.1	37.8	33.0	24.3	81.2
14	31	43.2	41.7	41.6	44.2	37.6	33.0	25.7	70.0
15	31	43.2	41.7	42.2	43.7	37.8	32.7	24.3	76.7
16	31	44.4	40.9	40.9	42.1	36.3	32.1	23.8	83.2
17	31	43.5	41.0	40.0	42.1	36.6	32.3	24.2	75.3
18	31	43.5	40.6	41.3	41.2	34.8	31.9	24.5	76.6
19	31	45.3	42.6	42.0	43.3	37.3	33.5	25.4	81.0
20	31	44.5	43.2	42.3	44.4	41.3	38.4	26.5	71.0
21	31	46.5	45.1	45.1	46.5	45.3	40.8	29.7	75.5
22	31	46.8	44.8	45.5	46.4	45.4	44.5	27.5	65.0
23	31	47.4	44.7	46.6	48.0	46.0	43.6	25.0	67.8
								Min=23.1	Max=83.8

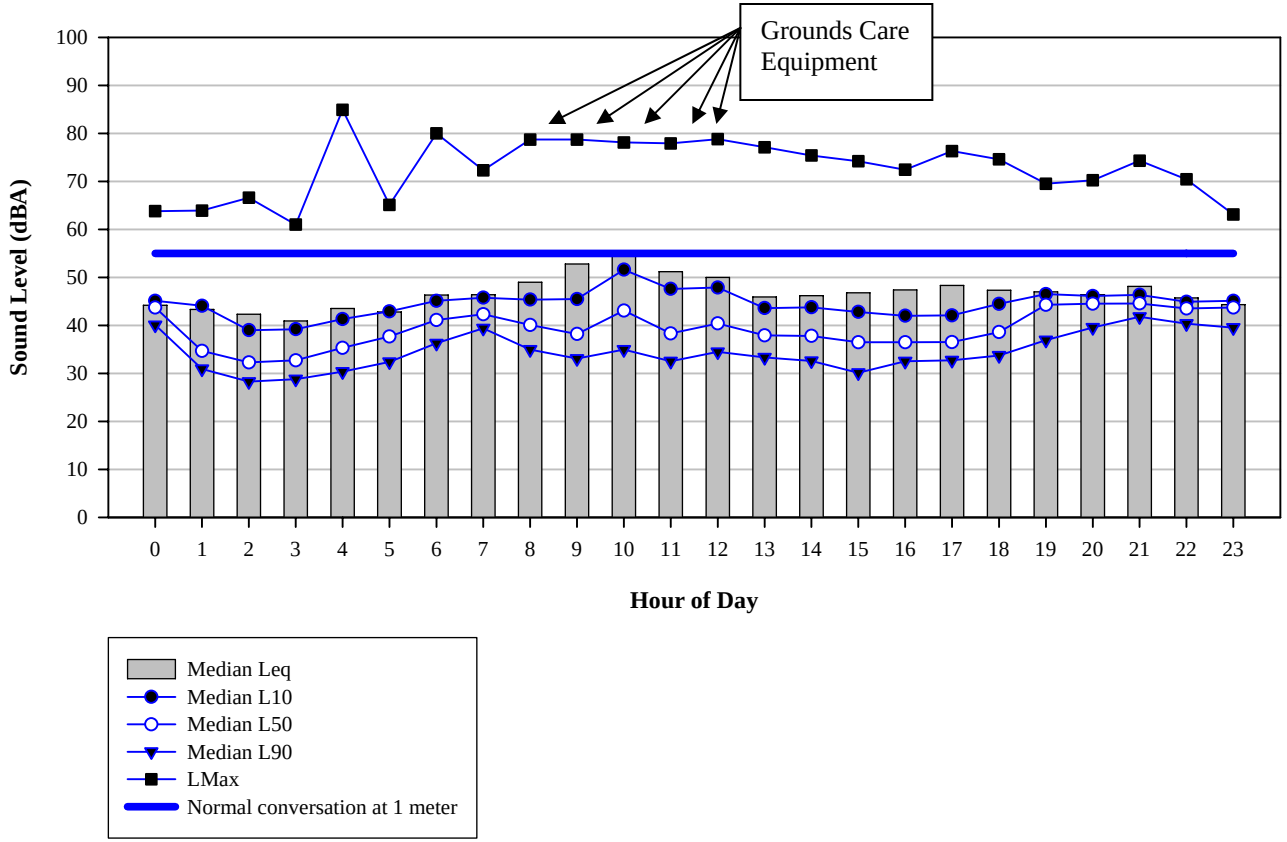

Figure II-7. Hourly sound levels (dBA), Whitman Mission National Historic Site (9-01-2002 to 9-30-2002).

Table II-7. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 9-01-2002 to 9-30-2002 (n=719).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	30	44.2	41.7	43.9	45.1	43.7	40.1	24.9	63.8
1	30	43.3	39.9	39.1	44.1	34.7	30.9	23.2	63.9
2	30	42.3	37.9	35.7	39.0	32.3	28.3	22.7	66.6
3	30	40.9	38.1	36.3	39.2	32.7	28.8	22.5	61.0
4	30	43.5	39.1	38.5	41.3	35.3	30.4	23.6	84.9
5	30	42.8	40.3	40.2	42.9	37.7	32.4	23.6	65.1
6	30	46.3	45.4	44.5	45.1	41.1	36.3	25.2	80.0
7	30	46.4	44.6	44.5	45.8	42.3	39.4	25.5	72.3
8	30	49.0	44.4	42.9	45.4	40.1	35.0	25.4	78.7
9	30	52.8	46.6	43.7	45.5	38.2	33.1	23.9	78.7
10	30	55.0	49.5	50.4	51.6	43.1	35.0	25.1	78.1
11	29	51.2	46.8	45.9	47.6	38.3	32.5	24.4	77.9
12	30	50.0	45.5	46.4	47.9	40.4	34.5	23.0	78.8
13	30	45.9	42.9	42.6	43.6	37.9	33.3	23.8	77.1
14	30	46.2	42.4	41.5	43.8	37.8	32.6	23.7	75.4
15	30	46.8	41.1	41.7	42.8	36.5	30.1	23.7	74.2
16	30	47.4	41.8	40.5	42.0	36.5	32.5	23.5	72.4
17	30	48.3	42.7	41.5	42.1	36.5	32.7	23.7	76.3
18	30	47.3	44.0	44.0	44.5	38.6	33.7	25.2	74.6
19	30	47.0	44.9	45.2	46.5	44.3	36.9	27.4	69.5
20	30	46.4	44.5	44.5	46.1	44.5	39.6	30.1	70.2
21	30	48.1	44.8	44.6	46.4	44.6	41.8	27.7	74.3
22	30	45.7	42.4	44.1	44.9	43.5	40.4	23.9	70.4
23	30	44.3	41.9	44.5	45.1	43.7	39.5	25.2	63.1
								Min=22.5	Max=84.9

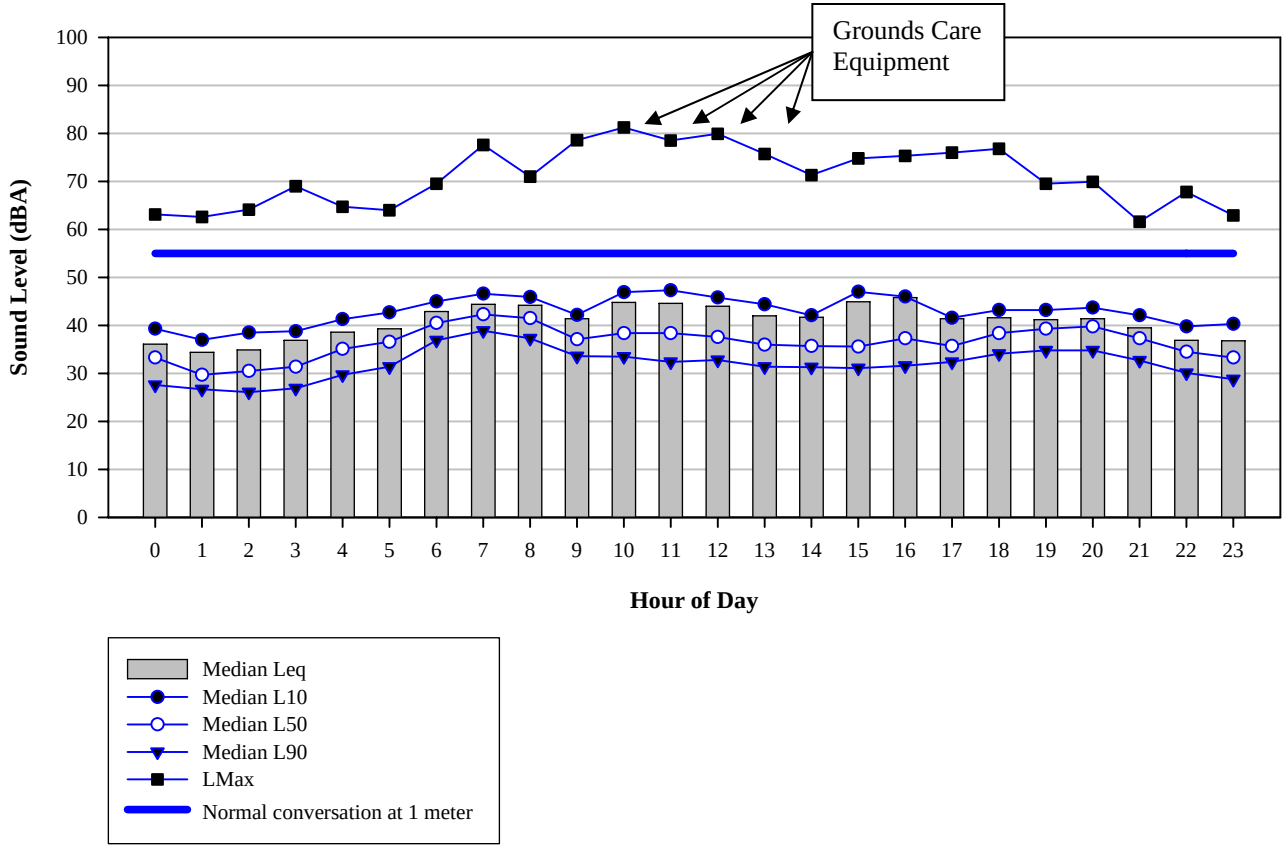

Figure II-8. Hourly sound levels (dBA), Whitman Mission National Historic Site (10-01-2002 to 10-31-2002).

Table II-8. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 10-01-2002 to 10-31-2002 (n=744).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	31	41.4	38.0	36.1	39.3	33.3	27.6	21.9	63.1
1	31	37.5	34.7	34.4	37.0	29.7	26.7	21.6	62.6
2	31	41.0	35.9	34.9	38.5	30.5	26.1	21.1	64.1
3	31	39.8	36.8	36.9	38.8	31.4	26.9	21.4	69.0
4	31	41.0	38.5	38.6	41.3	35.1	29.7	20.6	64.7
5	31	42.7	39.3	39.3	42.7	36.6	31.4	22.1	64.0
6	31	44.6	43.3	42.9	45.0	40.5	36.9	23.7	69.5
7	31	46.0	44.6	44.4	46.6	42.3	38.9	25.7	77.6
8	31	46.5	43.6	44.2	45.9	41.5	37.3	23.0	71.0
9	31	50.7	42.9	41.4	42.2	37.1	33.6	21.9	78.6
10	31	54.6	46.4	44.8	46.9	38.4	33.5	24.0	81.2
11	31	50.8	45.7	44.6	47.3	38.4	32.4	24.0	78.5
12	31	53.0	45.3	44.0	45.8	37.6	32.8	23.4	79.9
13	31	48.2	43.8	42.0	44.4	36.0	31.4	23.5	75.7
14	31	42.7	41.4	41.7	42.1	35.7	31.3	22.8	71.3
15	31	45.0	43.3	44.9	47.0	35.6	31.1	22.4	74.8
16	31	46.3	44.3	45.8	46.0	37.3	31.6	22.4	75.3
17	31	43.5	41.6	41.4	41.6	35.7	32.4	24.6	76.0
18	31	43.6	41.7	41.6	43.2	38.4	34.1	23.3	76.8
19	31	42.8	41.4	41.2	43.2	39.3	34.8	24.1	69.5
20	31	42.2	41.3	41.4	43.7	39.8	34.8	23.7	69.9
21	31	42.4	40.5	39.5	42.1	37.3	32.7	25.1	61.6
22	31	41.7	38.5	36.9	39.8	34.5	30.1	23.0	67.8
23	31	40.5	37.7	36.8	40.3	33.3	28.8	22.2	62.9
								Min=20.6	Max=81.2

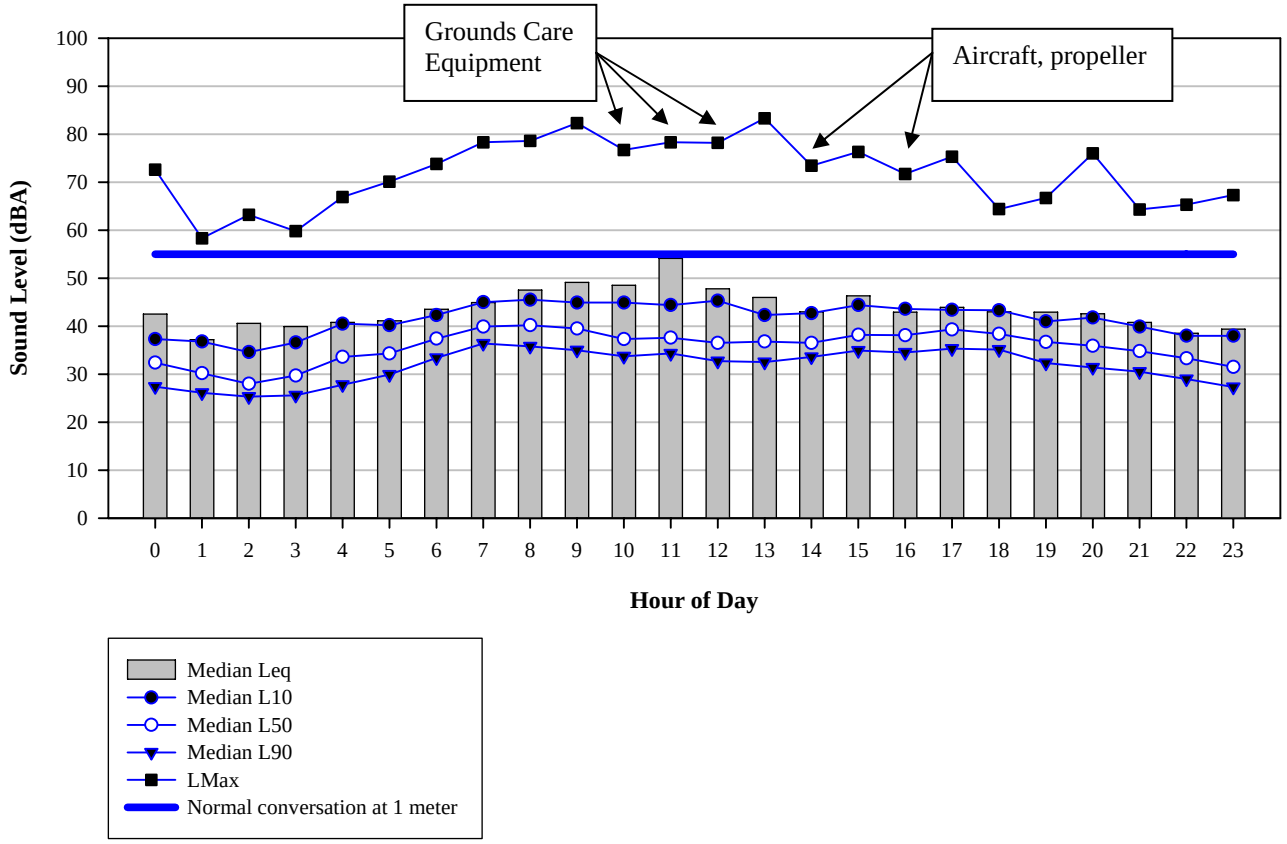

Figure II-9. Hourly sound levels (dBA), Whitman Mission National Historic Site (11-01-2002 to 11-25-2002).

Table II-9. Hourly Sound Levels (dBA), Whitman Mission National Historic Site, WA, 11-01-2002 to 11-25-2002 (n=600).

Hour of Day	Number of Hours	Logarithmic Mean Leq	Arithmetic Mean Leq	Median Leq	Median L10	Median L50	Median L90	LMin	LMax
0	25	42.5	35.5	34.3	37.3	32.4	27.4	19.8	72.6
1	25	37.2	33.8	33.4	36.8	30.2	26.1	19.0	58.3
2	25	40.6	33.7	31.7	34.6	28.0	25.3	19.0	63.2
3	25	39.9	34.7	33.8	36.6	29.7	25.6	19.0	59.8
4	25	40.8	36.3	36.7	40.5	33.6	27.8	19.3	66.9
5	25	41.1	37.5	36.8	40.2	34.3	29.9	18.8	70.1
6	25	43.5	40.7	41.1	42.3	37.4	33.4	18.7	73.8
7	25	44.9	43.4	43.6	45.0	39.9	36.4	21.7	78.3
8	25	47.5	45.0	43.6	45.5	40.2	35.8	23.4	78.6
9	25	49.1	43.8	44.1	44.9	39.5	35.0	23.3	82.3
10	25	48.5	43.7	43.2	44.9	37.3	33.7	24.8	76.7
11	25	54.1	42.8	41.3	44.4	37.6	34.3	21.0	78.3
12	25	47.8	44.1	43.0	45.3	36.5	32.7	20.6	78.2
13	25	46.0	42.2	41.1	42.3	36.8	32.5	21.8	83.3
14	25	43.0	41.3	41.9	42.7	36.5	33.6	23.8	73.4
15	25	46.3	43.6	43.9	44.4	38.2	34.9	23.1	76.3
16	25	42.9	41.9	41.5	43.6	38.1	34.5	23.3	71.7
17	25	43.9	41.4	41.2	43.4	39.3	35.3	20.6	75.3
18	25	43.0	40.5	40.8	43.3	38.4	35.1	20.3	64.4
19	25	42.9	39.6	38.4	41.0	36.7	32.3	20.7	66.7
20	25	42.6	39.6	39.3	41.8	35.9	31.4	20.3	76.0
21	25	40.8	38.0	37.1	39.9	34.8	30.5	20.5	64.3
22	25	38.5	36.0	35.9	38.0	33.3	29.0	20.2	65.3
23	25	39.4	35.4	35.1	38.0	31.5	27.3	19.7	67.3
								Min=18.7	Max=83.3

Appendix III. Event Table and Event Log for Whitman Mission National Historic Site, WA, 11-03-2001 to 12-14-2002.

Source Key:

1	Jet Aircraft	21	Wind
2	Propeller Aircraft	22	Rain
3	Helicopter	23	Thunder
19	Human-caused, other		

WAV EVENT SITE	DATE	TIME	SEC OF DAY	MAX dB	DURATION OF EVENT (seconds)	SOURCE	REMARKS
Whitman Mission NHS	11/3/2001	13:32:18					Started,11/3/2001 1:32:18 PM,WHMI2, Threshold SPL = 60, Minimum Duration = 10sec, Wave Sample Interval = 5 min, Wave Sample Duration = 5sec, Bits per sample = 16, Samples per sec = 11025
Whitman Mission NHS	11/3/2001	13:32:34	48754	93.7	16.625	calibrator	System calibration, beginning of measurement.
Whitman Mission NHS	11/3/2001	13:32:49	48769	93.7	16.5	calibrator	
Whitman Mission NHS	11/3/2001	13:33:05	48784	93.7	16.375	calibrator	
Whitman Mission NHS	11/4/2001	8:39:00	31140	69.0	12.375	19	mower/blower
Whitman Mission NHS	11/4/2001	8:44:26	31466	67.5	20.5	19	mower/blower
Whitman Mission NHS	11/4/2001	8:50:33	31833	67.5	15.375	19	mower/blower
Whitman Mission NHS	11/4/2001	8:51:37	31897	66.9	19.25	19	mower/blower
Whitman Mission NHS	11/4/2001	8:52:12	31932	67.0	17.625	19	mower/blower
Whitman Mission NHS	11/4/2001	8:52:57	31977	67.3	21.75	19	mower/blower
Whitman Mission NHS	11/4/2001	8:56:13	32173	66.4	13.125	19	mower/blower
Whitman Mission NHS	11/5/2001	10:56:24	39384	71.4	15.125	2	
Whitman Mission NHS	11/6/2001	15:25:07	55507	72.3	11	2	
Whitman Mission NHS	11/7/2001	6:49:53	24593	62.3	16.125	19	mower/blower
Whitman Mission NHS	11/7/2001	16:39:52	59992	67.1	10.25	2	

Whitman Mission NHS	11/10/2001	8:31:47	30707	63.1	12.75	19	mower/blower
Whitman Mission NHS	11/11/2001	7:48:31	28111	66.6	17.25	19	mower/blower
Whitman Mission NHS	11/13/2001	11:00:00					Stopped
Whitman Mission NHS	12/14/2001	10:14:22					Started,12/14/2001 10:14:22 AM,WHMI2, Threshold SPL = 65, Minimum Duration = 10sec, Wave Sample Interval = 5 min, Wave Sample Duration = 5sec, Bits per sample = 16, Samples per sec = 11025
Whitman Mission NHS	12/14/2001	12:00:00					Stopped
Whitman Mission NHS	1/17/2002	13:35:11					Started,1/17/2002 1:35:11 PM,WHMI2, Threshold SPL = 65, Minimum Duration = 10sec, Wave Sample Interval = 5 min, Wave Sample Duration = 5sec, Bits per sample = 16, Samples per sec = 11025
Whitman Mission NHS	1/17/2002	17:00:00					Stopped
Whitman Mission NHS	2/6/2002	16:03:28					Started,2/6/2002 4:03:28 PM,WHMI2, Threshold SPL = 65, Minimum Duration = 10sec, Wave Sample Interval = 5 min, Wave Sample Duration = 5sec, Bits per sample = 16, Samples per sec = 11025
Whitman Mission NHS	2/6/2002	16:03:44	57824	93.8	16.5	calibrator	
Whitman Mission NHS	2/6/2002	16:03:59	57839	93.8	16.625	calibrator	
Whitman Mission NHS	2/6/2002	16:04:14	57854	108.9	16.125	calibrator	
Whitman Mission NHS	2/11/2002	16:26:36	59196	70.1	10.625	2	
Whitman Mission NHS	2/12/2002	18:10:01	65401	78.3	12.5	2	
Whitman Mission NHS	2/13/2002	17:07:58	61678	73.5	13.25	2	
Whitman Mission NHS	2/14/2002	10:31:21	37881	72.9	14.25	2	
Whitman Mission NHS	2/14/2002	17:02:42	61362	80.0	13.875	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	10:57:33	39452	85.6	11.125	2	Also: Black-billed Magpie
Whitman Mission NHS	2/15/2002	10:57:58	39478	76.0	12.875	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	10:58:43	39523	88.9	19.5	2	
Whitman Mission NHS	2/15/2002	10:59:08	39548	78.0	14.75	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	10:59:43	39583	87.6	12.25	2	

Whitman Mission NHS	2/15/2002	11:00:18	39618	78.4	11.25	2	
Whitman Mission NHS	2/15/2002	11:01:43	39703	83.5	14.5	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:02:49	39769	85.2	20.5	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:03:44	39824	86.5	11.25	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:04:39	39879	86.5	20.125	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:05:34	39934	85.5	13	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:06:30	39990	89.3	20.5	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:06:55	40015	78.7	10.75	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/15/2002	11:07:20	40040	85.2	19.125	2	
Whitman Mission NHS	2/15/2002	11:07:45	40065	85.9	10.125	2	
Whitman Mission NHS	2/15/2002	11:28:46	41326	89.0	12.375	2	
Whitman Mission NHS	2/15/2002	11:29:31	41371	93.6	16.625	2	
Whitman Mission NHS	2/15/2002	12:54:11	46451	80.8	13.25	2	
Whitman Mission NHS	2/15/2002	13:21:04	48064	82.6	12.5	2	
Whitman Mission NHS	2/15/2002	15:47:20	56840	84.5	10.25	2	
Whitman Mission NHS	2/15/2002	16:24:09	59049	76.3	11.25	2	Also: Red-winged Blackbird
Whitman Mission NHS	2/20/2002	13:10:03	47403	72.0	11.25	2	
Whitman Mission NHS	5/5/2002	10:55:07					Started,5/5/2002 10:55:07 AM,WHMI2, Threshold SPL = 95/70, Minimum Duration = 0.5/10sec, Wave Sample Interval = 5|0|0|0|0|0| min, Wave Sample Duration = 5|1|1|1|1|1|sec, Bits per sample = 16, Samples per sec = 11025
Whitman Mission NHS	5/5/2002	10:55:23	39323	93.7	39323.1	calibrator	
Whitman Mission NHS	5/5/2002	10:55:48	39348	93.7	24.82813	calibrator	
Whitman Mission NHS	5/5/2002	10:56:03	39363	93.7	15.12109	calibrator	
Whitman Mission NHS	5/5/2002	10:56:28	39388	108.7	21.75781	calibrator	
Whitman Mission NHS	5/15/2002	10:54:25	39265	73.2	11.23047	19	mower/blower
Whitman Mission NHS	5/20/2002	11:11:46	40306	77.0	15.22266	19	mower/blower
Whitman Mission NHS	5/20/2002	11:19:09	40749	77.0	12.6875	19	mower/blower
Whitman Mission NHS	5/28/2002	7:46:51	28008	76.3	12.79883	2	
Whitman Mission NHS	6/1/2002	9:18:54	33532	79.6	11.43359	2	
Whitman Mission NHS	6/13/2002	10:41:28	38485	80.1	14.47266	19	mower/blower

Whitman Mission NHS	6/13/2002	10:41:43	38503	80.2	12.14063	19	mower/blower
Whitman Mission NHS	6/21/2002	9:56:39	35796	79.3	10.40625	19	mower/blower
Whitman Mission NHS	6/21/2002	10:42:58	38578	75.0	13.25391	19	mower/blower
Whitman Mission NHS	7/1/2002	10:42:08	38525	76.3	15.01172	19	mower/blower
Whitman Mission NHS	7/4/2002	12:13:20	43997	73.5	10.3125	19	mower/blower
Whitman Mission NHS	7/29/2002	14:33:25	52405	94.0	15.13672	calibrator	
Whitman Mission NHS	7/29/2002	14:33:40	52420	93.9	15.125	calibrator	
Whitman Mission NHS	7/29/2002	14:33:55	52435	93.8	15.13281	calibrator	
Whitman Mission NHS	7/29/2002	15:25:46					Started,7/29/2002 3:25:46 PM,WHMI2, Threshold SPL = 95/65, Minimum Duration = 0.5/10sec, Wave Sample Interval = 5|0|0|0|0| min, Wave Sample Duration = 5|1|1|1|1|sec, Bits per sample = 16, Samples per sec = 11025
Whitman Mission NHS	7/29/2002	15:26:02	55562	93.8	55561.94	calibrator	
Whitman Mission NHS	7/29/2002	15:26:17	55577	93.8	15.10156	calibrator	
Whitman Mission NHS	8/1/2002	9:00:05	32405	69.0	11.56836	19	mower/blower
Whitman Mission NHS	8/1/2002	9:07:13	32833	69.4	14.70703	19	mower/blower
Whitman Mission NHS	8/1/2002	9:16:42	33402	69.9	10.27344	19	mower/blower
Whitman Mission NHS	8/1/2002	9:55:12	35712	73.1	11.85547	19	mower/blower
Whitman Mission NHS	8/1/2002	9:57:28	35848	73.2	10.67578	19	mower/blower
Whitman Mission NHS	8/1/2002	9:57:43	35863	74.9	10.36719	19	mower/blower
Whitman Mission NHS	8/1/2002	9:58:18	35898	74.6	23.70313	19	mower/blower
Whitman Mission NHS	8/1/2002	11:08:30	40110	78.0	14.19922	19	mower/blower
Whitman Mission NHS	8/1/2002	11:14:38	40478	68.9	15.20703	19	mower/blower
Whitman Mission NHS	8/1/2002	15:51:40	57100	76.7	12.98438	2	
Whitman Mission NHS	8/3/2002	9:45:20	35120	73.5	12.57813	2	
Whitman Mission NHS	8/5/2002	8:33:23	30803	71.0	20.74023	19	mower/blower
Whitman Mission NHS	8/5/2002	8:33:38	30818	77.2	10.81641	19	mower/blower
Whitman Mission NHS	8/5/2002	8:33:53	30833	71.4	15.16211	19	mower/blower
Whitman Mission NHS	8/5/2002	8:36:19	30979	70.3	21.17773	19	mower/blower
Whitman Mission NHS	8/5/2002	8:39:56	31196	69.5	13.20898	19	mower/blower
Whitman Mission NHS	8/5/2002	8:48:55	31735	69.2	16.2832	19	mower/blower

Whitman Mission NHS	8/5/2002	8:58:23	32303	67.4	10.35547	19	mower/blower
Whitman Mission NHS	8/5/2002	10:35:26	38126	69.1	18.25781	19	mower/blower
Whitman Mission NHS	8/6/2002	10:53:16	39196	71.0	12.46875	19	mower/blower
Whitman Mission NHS	8/6/2002	10:54:22	39262	69.9	10.48438	19	mower/blower
Whitman Mission NHS	8/6/2002	10:58:39	39519	69.5	16.08203	19	mower/blower
Whitman Mission NHS	8/8/2002	9:46:15	35175	76.4	23.38672	19	mower/blower
Whitman Mission NHS	8/8/2002	9:50:41	35441	74.9	23.64844	19	mower/blower
Whitman Mission NHS	8/8/2002	10:10:54	36654	71.0	12.51563	19	mower/blower
Whitman Mission NHS	8/8/2002	10:11:50	36710	71.3	15.0625	19	mower/blower
Whitman Mission NHS	8/8/2002	10:12:15	36735	69.5	12.46484	19	mower/blower
Whitman Mission NHS	8/8/2002	10:13:00	36780	73.3	20.98438	19	mower/blower
Whitman Mission NHS	8/8/2002	10:13:15	36795	71.5	10.46484	19	mower/blower
Whitman Mission NHS	8/8/2002	10:13:51	36831	74.0	18.84766	19	mower/blower
Whitman Mission NHS	8/8/2002	10:14:16	36856	72.7	12.91016	19	mower/blower
Whitman Mission NHS	8/8/2002	12:48:11	46091	77.0	14.56641	19	mower/blower
Whitman Mission NHS	8/12/2002	10:55:16	39316	75.2	18.05078	19	mower/blower
Whitman Mission NHS	8/12/2002	10:58:43	39523	74.3	20.34375	19	mower/blower
Whitman Mission NHS	8/12/2002	12:14:07	44047	71.4	15.86719	19	mower/blower
Whitman Mission NHS	8/12/2002	12:16:13	44173	72.8	18.50781	19	mower/blower
Whitman Mission NHS	8/12/2002	12:18:19	44299	71.5	11.76172	19	mower/blower
Whitman Mission NHS	8/12/2002	12:20:45	44445	72.6	13.26563	19	mower/blower
Whitman Mission NHS	8/12/2002	12:22:40	44560	73.3	10.29297	19	mower/blower
Whitman Mission NHS	8/14/2002	13:25:50	48350	73.7	15.5	2	
Whitman Mission NHS	8/14/2002	20:07:11	72431	69.7	12.60156	2	
Whitman Mission NHS	8/15/2002	8:44:30	31470	76.6	20.54883	19	mower/blower
Whitman Mission NHS	8/15/2002	8:49:47	31787	69.3	15.62109	19	mower/blower
Whitman Mission NHS	8/15/2002	9:06:28	32788	69.5	12.625	19	mower/blower
Whitman Mission NHS	8/15/2002	9:10:25	33025	70.5	15.69922	19	mower/blower
Whitman Mission NHS	8/15/2002	9:19:13	33553	70.2	16.28906	19	mower/blower
Whitman Mission NHS	8/15/2002	10:23:03	37383	74.3	16.63281	19	mower/blower
Whitman Mission NHS	8/16/2002	8:17:27	29847	69.3	18.78906	19	mower/blower
Whitman Mission NHS	8/16/2002	10:36:46	38206	68.0	13.69922	19	tractor or large machinery

Whitman Mission NHS	8/19/2002	8:38:13	31093	73.8	10.33594	2	
Whitman Mission NHS	8/19/2002	10:48:19	38899	71.8	15.22656	19	mower/blower
Whitman Mission NHS	8/19/2002	10:56:37	39397	70.3	17.95313	19	mower/blower
Whitman Mission NHS	8/19/2002	10:59:13	39553	78.3	20.13281	19	mower/blower
Whitman Mission NHS	8/19/2002	11:04:30	39870	69.6	13.97656	19	mower/blower
Whitman Mission NHS	8/19/2002	11:06:46	40006	73.6	21.32031	19	mower/blower
Whitman Mission NHS	8/19/2002	11:08:42	40122	74.9	15.82813	19	mower/blower
Whitman Mission NHS	8/19/2002	11:09:37	40177	74.8	22.28516	19	mower/blower
Whitman Mission NHS	8/19/2002	12:32:14	45134	76.5	16.38281	19	mower/blower
Whitman Mission NHS	8/20/2002	10:28:00	37680	75.2	16.19531	19	weed-whacker/mower
Whitman Mission NHS	8/20/2002	10:28:46	37726	73.9	23.55078	19	mower/blower
Whitman Mission NHS	8/20/2002	10:29:01	37741	69.5	11.23438	19	mower/blower
Whitman Mission NHS	8/20/2002	10:52:45	39165	70.3	14.05078	19	mower/blower
Whitman Mission NHS	8/21/2002	17:23:50	62630	72.0	12.69922	2	
Whitman Mission NHS	8/21/2002	17:38:01	63481	70.3	12.85156	2	
Whitman Mission NHS	8/22/2002	7:04:38	25478	69.3	11.11719	2	
Whitman Mission NHS	8/22/2002	8:29:46	30586	75.5	20.5293	19	mower/blower
Whitman Mission NHS	8/22/2002	8:30:01	30601	78.8	12.78906	19	mower/blower
Whitman Mission NHS	8/22/2002	8:36:39	30999	69.8	14.80078	19	mower/blower
Whitman Mission NHS	8/22/2002	8:43:06	31386	68.8	14.8418	19	mower/blower
Whitman Mission NHS	8/22/2002	8:46:52	31612	68.4	11.51758	19	mower/blower
Whitman Mission NHS	8/22/2002	8:50:49	31849	69.8	11.05664	19	mower/blower
Whitman Mission NHS	8/22/2002	8:51:34	31894	70.3	12.36719	19	mower/blower
Whitman Mission NHS	8/22/2002	13:09:19	47359	81.8	23.55078	19	mower/blower
Whitman Mission NHS	8/22/2002	13:09:44	47384	76.0	11.08984	19	mower/blower
Whitman Mission NHS	8/25/2002	7:41:59	27719	70.8	15.96094	19	mower/blower
Whitman Mission NHS	8/26/2002	8:38:06	31086	71.9	14.99219	19	mower/blower
Whitman Mission NHS	8/26/2002	8:38:21	31101	79.9	15.07422	19	mower/blower
Whitman Mission NHS	8/26/2002	8:43:08	31388	71.6	18.04688	19	mower/blower
Whitman Mission NHS	8/26/2002	9:01:00	32460	68.2	13.06641	19	mower/blower
Whitman Mission NHS	8/26/2002	9:23:14	33794	69.8	16.95703	19	mower/blower
Whitman Mission NHS	8/26/2002	9:57:02	35822	71.5	18.39453	19	mower/blower

Whitman Mission NHS	8/26/2002	9:58:17	35897	75.4	18.61719	19	mower/blower
Whitman Mission NHS	8/26/2002	9:59:23	35963	76.5	17.33594	19	mower/blower
Whitman Mission NHS	8/26/2002	10:00:08	36008	77.4	24.74219	19	mower/blower
Whitman Mission NHS	8/26/2002	10:00:33	36033	71.7	15.70313	19	mower/blower
Whitman Mission NHS	8/26/2002	10:01:49	36109	67.7	10.45313	19	mower/blower
Whitman Mission NHS	8/26/2002	10:51:13	39073	75.1	18.77734	19	mower/blower
Whitman Mission NHS	8/29/2002	11:16:59	40619	75.9	12.14453	1	
Whitman Mission NHS	8/30/2002	6:38:45	23925	69.4	10.19531	21	
Whitman Mission NHS	8/31/2002	12:08:57	43737	73.7	11.26563	2	
Whitman Mission NHS	9/2/2002	9:38:42	34722	71.8	13.94141	19	mower/blower
Whitman Mission NHS	9/2/2002	9:40:48	34848	78.9	20.97656	19	mower/blower
Whitman Mission NHS	9/2/2002	9:58:20	35900	78.4	19.39453	19	mower/blower
Whitman Mission NHS	9/2/2002	9:59:05	35945	74.1	21.25391	19	mower/blower
Whitman Mission NHS	9/2/2002	9:59:20	35960	77.1	15.06641	19	mower/blower
Whitman Mission NHS	9/2/2002	10:05:38	36338	78.6	20.33984	19	mower/blower
Whitman Mission NHS	9/2/2002	10:08:24	36504	73.1	12.80859	19	mower/blower
Whitman Mission NHS	9/2/2002	10:13:41	36821	70.1	12.66016	19	mower/blower
Whitman Mission NHS	9/2/2002	10:15:16	36916	74.9	19.10938	19	mower/blower
Whitman Mission NHS	9/2/2002	10:37:50	38270	74.2	16.75391	19	mower/blower
Whitman Mission NHS	9/2/2002	10:39:06	38346	75.7	17.63281	19	mower/blower
Whitman Mission NHS	9/2/2002	10:40:31	38431	74.0	20.85547	19	mower/blower
Whitman Mission NHS	9/2/2002	10:42:27	38547	77.7	11.97656	19	mower/blower
Whitman Mission NHS	9/2/2002	10:43:43	38622	79.5	17.49219	19	mower/blower
Whitman Mission NHS	9/2/2002	11:08:27	40107	70.9	10.59375	19	mower/blower
Whitman Mission NHS	9/2/2002	11:36:13	41773	77.5	20.70703	19	mower/blower
Whitman Mission NHS	9/3/2002	12:39:01	45541	77.9	17.46875	2	
Whitman Mission NHS	9/5/2002	8:35:22	30922	72.6	16.24414	19	mower/blower
Whitman Mission NHS	9/5/2002	8:35:37	30937	77.7	13.36914	19	mower/blower
Whitman Mission NHS	9/5/2002	8:42:25	31345	71.3	16.20313	19	mower/blower
Whitman Mission NHS	9/5/2002	8:51:44	31904	74.8	15.04102	19	mower/blower
Whitman Mission NHS	9/5/2002	8:54:30	32070	74.6	12.61719	19	mower/blower
Whitman Mission NHS	9/5/2002	8:59:07	32347	74.3	11.09766	19	mower/blower

Whitman Mission NHS	9/5/2002	9:08:26	32906	68.1	10.72266	19	mower/blower
Whitman Mission NHS	9/5/2002	10:25:50	37550	68.9	10.09766	19	mower/blower
Whitman Mission NHS	9/5/2002	10:35:39	38139	76.2	15.37891	19	mower/blower
Whitman Mission NHS	9/5/2002	11:27:24	41244	67.2	11.28906	19	mower/blower
Whitman Mission NHS	9/6/2002	13:58:56	50336	72.9	10.44922	19	mower/blower
Whitman Mission NHS	9/9/2002	8:51:58	31918	71.2	18.35742	19	mower/blower
Whitman Mission NHS	9/9/2002	10:06:52	36412	71.1	18.20313	19	mower/blower
Whitman Mission NHS	9/9/2002	10:14:41	36881	70.4	12.60547	19	mower/blower
Whitman Mission NHS	9/9/2002	10:16:57	37017	73.5	15.5	19	mower/blower
Whitman Mission NHS	9/9/2002	10:19:23	37162	73.4	19.26172	19	mower/blower
Whitman Mission NHS	9/9/2002	10:20:18	37218	74.3	17.52734	19	mower/blower
Whitman Mission NHS	9/9/2002	10:20:33	37233	70.4	11.04297	19	mower/blower
Whitman Mission NHS	9/9/2002	10:39:45	38385	74.6	20.60156	19	mower/blower
Whitman Mission NHS	9/9/2002	10:45:23	38723	74.0	22.97656	19	mower/blower
Whitman Mission NHS	9/9/2002	10:45:58	38758	72.6	16.45313	19	mower/blower
Whitman Mission NHS	9/9/2002	12:10:16	43816	75.1	14	19	mower/blower
Whitman Mission NHS	9/10/2002	12:10:33	43833	72.0	18.33984	19	mower/blower
Whitman Mission NHS	9/10/2002	12:10:58	43858	70.8	13.69531	19	mower/blower
Whitman Mission NHS	9/12/2002	10:35:13	38113	71.8	17.23438	19	mower/blower
Whitman Mission NHS	9/12/2002	10:35:48	38148	78.8	16.29688	19	mower/blower
Whitman Mission NHS	9/12/2002	10:42:25	38545	70.4	14.13281	19	mower/blower
Whitman Mission NHS	9/12/2002	10:45:52	38752	77.4	19.76563	19	mower/blower
Whitman Mission NHS	9/12/2002	11:07:46	40065	75.2	12.01953	19	mower/blower
Whitman Mission NHS	9/12/2002	11:09:21	40161	74.4	12.1875	19	mower/blower
Whitman Mission NHS	9/12/2002	11:10:06	40206	75.5	12.03516	19	mower/blower
Whitman Mission NHS	9/12/2002	11:11:02	40262	76.3	17.01953	19	mower/blower
Whitman Mission NHS	9/12/2002	11:12:17	40337	70.3	10.33203	19	mower/blower
Whitman Mission NHS	9/12/2002	11:24:17	41057	68.2	18.85938	19	mower/blower
Whitman Mission NHS	9/12/2002	11:25:12	41112	69.6	10.83594	19	mower/blower
Whitman Mission NHS	9/12/2002	12:24:20	44660	78.8	13.5625	19	mower/blower
Whitman Mission NHS	9/14/2002	16:28:08	59288	72.7	13.15234	2	
Whitman Mission NHS	9/16/2002	8:38:19	31099	78.7	21.99023	19	mower/blower

Whitman Mission NHS	9/16/2002	8:41:55	31315	70.8	14.24023	19	mower/blower
Whitman Mission NHS	9/16/2002	8:43:41	31421	76.3	17.29492	19	mower/blower
Whitman Mission NHS	9/16/2002	9:07:26	32846	70.7	10.11719	19	mower/blower
Whitman Mission NHS	9/16/2002	9:09:01	32941	73.8	11.34766	19	mower/blower
Whitman Mission NHS	9/16/2002	9:19:10	33550	73.4	10.39453	19	mower/blower
Whitman Mission NHS	9/16/2002	10:27:22	37642	68.9	11.6875	19	mower/blower
Whitman Mission NHS	9/19/2002	9:44:39	35079	78.3	22.98047	19	mower/blower
Whitman Mission NHS	9/19/2002	9:51:07	35467	71.9	14.03125	19	mower/blower
Whitman Mission NHS	9/19/2002	9:52:52	35572	79.1	21.94922	19	mower/blower
Whitman Mission NHS	9/19/2002	10:06:02	36362	68.1	11.99609	19	mower/blower
Whitman Mission NHS	9/19/2002	10:07:48	36468	69.4	13.23828	19	mower/blower
Whitman Mission NHS	9/19/2002	10:09:23	36563	69.4	12.16016	19	mower/blower
Whitman Mission NHS	9/19/2002	10:11:59	36719	71.8	14.23828	19	mower/blower
Whitman Mission NHS	9/19/2002	10:12:45	36765	73.1	13.37891	19	mower/blower
Whitman Mission NHS	9/19/2002	10:13:00	36780	73.0	10.41406	19	mower/blower
Whitman Mission NHS	9/19/2002	10:47:38	38858	74.4	19.00391	19	mower/blower
Whitman Mission NHS	9/19/2002	12:57:44	46664	68.7	18.02344	19	mower/blower
Whitman Mission NHS	9/19/2002	12:59:10	46750	69.5	11.63672	19	mower/blower
Whitman Mission NHS	9/20/2002	11:09:01	40141	70.4	15.50391	19	mower/blower
Whitman Mission NHS	9/20/2002	11:09:16	40156	70.5	15.08203	19	mower/blower
Whitman Mission NHS	9/23/2002	10:04:24	36264	71.7	15.70313	19	mower/blower
Whitman Mission NHS	9/23/2002	10:09:00	36540	75.0	13.80078	19	mower/blower
Whitman Mission NHS	9/23/2002	10:15:08	36908	71.5	18.67188	19	mower/blower
Whitman Mission NHS	9/23/2002	10:24:47	37487	69.5	18.01563	19	mower/blower
Whitman Mission NHS	9/23/2002	10:34:36	38076	72.1	22.49219	19	mower/blower
Whitman Mission NHS	9/23/2002	10:47:56	38876	70.7	13.07813	19	mower/blower
Whitman Mission NHS	9/23/2002	10:51:53	39113	73.5	15.53516	19	mower/blower
Whitman Mission NHS	9/23/2002	10:56:50	39410	73.6	14.33984	19	mower/blower
Whitman Mission NHS	9/23/2002	10:58:55	39535	73.4	17.83594	19	mower/blower
Whitman Mission NHS	9/23/2002	10:59:21	39561	68.3	12.36719	19	mower/blower
Whitman Mission NHS	9/23/2002	11:00:56	39656	74.6	21.97266	19	mower/blower
Whitman Mission NHS	9/23/2002	11:02:42	39762	76.1	15.89453	19	mower/blower

Whitman Mission NHS	9/23/2002	11:09:39	40179	74.6	16.40625	19	mower/blower
Whitman Mission NHS	9/23/2002	11:11:05	40265	74.0	13.47266	19	mower/blower
Whitman Mission NHS	9/23/2002	11:12:41	40361	70.7	11.63281	19	mower/blower
Whitman Mission NHS	9/23/2002	12:44:01	45841	74.4	17.74609	19	mower/blower
Whitman Mission NHS	9/24/2002	9:34:01	34441	79.1	15.39063	19	weedwhacker/mower
Whitman Mission NHS	9/24/2002	11:03:41	39821	72.7	24.85156	19	mower/blower
Whitman Mission NHS	9/24/2002	11:03:56	39836	72.3	15.00781	19	mower/blower
Whitman Mission NHS	9/24/2002	11:04:11	39851	74.2	15.07031	19	mower/blower
Whitman Mission NHS	9/24/2002	11:04:36	39876	70.1	15.62109	19	mower/blower
Whitman Mission NHS	9/25/2002	18:11:06	65466	71.4	11.04297	2	
Whitman Mission NHS	9/26/2002	10:40:55	38455	72.1	18.07422	19	mower/blower
Whitman Mission NHS	9/26/2002	10:45:22	38722	71.5	20.89063	19	mower/blower
Whitman Mission NHS	9/26/2002	12:00:27	43227	70.2	10.10156	19	mower/blower
Whitman Mission NHS	9/26/2002	12:01:32	43292	72.1	13.79688	19	mower/blower
Whitman Mission NHS	9/26/2002	12:02:47	43367	73.1	18.94531	19	mower/blower
Whitman Mission NHS	9/26/2002	12:03:53	43433	74.9	17.92578	19	mower/blower
Whitman Mission NHS	9/26/2002	12:04:48	43488	76.7	22.58984	19	mower/blower
Whitman Mission NHS	9/26/2002	12:05:43	43543	77.4	23.55469	19	mower/blower
Whitman Mission NHS	9/26/2002	12:06:29	43589	77.1	15.91406	19	mower/blower
Whitman Mission NHS	9/26/2002	12:06:44	43604	70.2	10.36719	19	mower/blower
Whitman Mission NHS	9/26/2002	12:08:19	43699	70.8	15.0625	19	mower/blower
Whitman Mission NHS	9/26/2002	12:08:55	43734	69.4	12.15625	19	mower/blower
Whitman Mission NHS	9/26/2002	12:49:25	46165	74.8	16.39063	19	mower/blower
Whitman Mission NHS	9/29/2002	9:11:45	33105	72.5	20.01172	21	
Whitman Mission NHS	9/29/2002	9:16:32	33392	72.2	18.23438	21	
Whitman Mission NHS	9/29/2002	9:17:37	33457	71.0	21.73438	21	
Whitman Mission NHS	9/29/2002	9:22:24	33744	70.2	10.19922	21	
Whitman Mission NHS	9/29/2002	9:22:49	33769	70.6	16.83594	21	
Whitman Mission NHS	9/29/2002	9:23:45	33825	69.1	10.24609	21	
Whitman Mission NHS	9/29/2002	9:27:41	34061	70.3	11.39453	21	
Whitman Mission NHS	9/29/2002	9:38:00	34680	67.4	10.125	21	
Whitman Mission NHS	9/29/2002	9:47:29	35249	72.1	17	21	

Whitman Mission NHS	9/29/2002	9:49:15	35355	73.5	12.14453	21	
Whitman Mission NHS	9/29/2002	9:49:50	35390	73.6	17.07031	21	
Whitman Mission NHS	9/29/2002	9:57:59	35879	71.0	14.91406	21	
Whitman Mission NHS	9/29/2002	9:58:24	35904	71.8	12.21484	21	
Whitman Mission NHS	9/29/2002	9:58:39	35919	72.6	15.08203	21	
Whitman Mission NHS	9/29/2002	9:58:54	35934	71.6	13.28906	21	
Whitman Mission NHS	9/29/2002	9:59:19	35959	72.6	22.27734	21	
Whitman Mission NHS	9/29/2002	10:00:14	36014	71.9	15.71094	21	
Whitman Mission NHS	9/29/2002	10:03:00	36180	69.5	13.39844	21	
Whitman Mission NHS	9/29/2002	10:05:26	36326	73.4	17.15625	21	
Whitman Mission NHS	9/29/2002	10:05:51	36351	69.9	19.63672	23	wind also
Whitman Mission NHS	9/29/2002	10:06:36	36396	71.8	13.17578	21	
Whitman Mission NHS	9/29/2002	10:14:55	36895	68.5	16.34766	23	wind also
Whitman Mission NHS	9/29/2002	10:15:30	36930	72.5	10.66016	23	wind also
Whitman Mission NHS	9/29/2002	10:16:05	36965	68.4	14.4375	23	wind also
Whitman Mission NHS	9/29/2002	10:25:04	37504	69.1	10.20313	19	mower/blower
Whitman Mission NHS	9/29/2002	10:25:39	37539	69.0	16.26563	19	mower/blower
Whitman Mission NHS	9/29/2002	10:25:54	37554	69.9	15.17188	19	mower/blower
Whitman Mission NHS	9/29/2002	10:27:50	37670	69.9	12.85938	19	mower/blower
Whitman Mission NHS	9/29/2002	10:32:27	37947	68.3	11.25391	23	wind also
Whitman Mission NHS	9/29/2002	14:08:56	50936	69.4	11.88672	21	
Whitman Mission NHS	9/29/2002	15:20:19	55219	71.8	17.35547	21	
Whitman Mission NHS	9/29/2002	17:10:28	61828	67.1	10.78516	21	thunder also
Whitman Mission NHS	9/29/2002	19:35:41	70541	74.5	14.73438	21	
Whitman Mission NHS	9/29/2002	21:06:21	75981	76.4	16.8125	21	
Whitman Mission NHS	9/29/2002	21:20:22	76822	71.3	15.94531	21	
Whitman Mission NHS	9/30/2002	9:53:59	35639	73.4	18.72266	19	mower/blower
Whitman Mission NHS	9/30/2002	9:57:45	35865	72.1	16.60938	19	mower/blower
Whitman Mission NHS	9/30/2002	10:01:22	36081	71.1	15.67969	19	mower/blower
Whitman Mission NHS	9/30/2002	10:16:42	37002	69.4	13.94141	19	mower/blower
Whitman Mission NHS	9/30/2002	10:18:58	37138	69.8	17.73438	19	mower/blower
Whitman Mission NHS	9/30/2002	10:20:24	37224	72.8	19.73828	19	mower/blower

Whitman Mission NHS	9/30/2002	10:21:29	37289	74.6	19.44141	19	mower/blower
Whitman Mission NHS	9/30/2002	10:22:05	37325	75.9	20.73438	19	mower/blower
Whitman Mission NHS	9/30/2002	10:22:30	37350	72.9	17.40625	19	mower/blower
Whitman Mission NHS	9/30/2002	10:22:55	37375	77.8	17.27344	19	mower/blower
Whitman Mission NHS	9/30/2002	10:23:40	37420	73.1	20.83203	19	mower/blower
Whitman Mission NHS	9/30/2002	10:48:15	38895	68.7	14.58203	19	mower/blower
Whitman Mission NHS	9/30/2002	11:20:12	40812	71.1	12.17578	19	mower/blower
Whitman Mission NHS	9/30/2002	11:20:27	40827	78.4	15.07813	19	mower/blower
Whitman Mission NHS	10/1/2002	16:01:49	57709	75.8	12.77734	3	
Whitman Mission NHS	10/3/2002	9:59:21	35961	77.6	20.65625	19	mower/blower
Whitman Mission NHS	10/3/2002	10:08:00	36480	72.2	13.20703	19	mower/blower
Whitman Mission NHS	10/3/2002	10:10:06	36606	75.6	16.04688	19	mower/blower
Whitman Mission NHS	10/3/2002	10:13:02	36782	73.4	12.00781	19	mower/blower
Whitman Mission NHS	10/3/2002	10:22:51	37371	75.9	13.50781	19	mower/blower
Whitman Mission NHS	10/3/2002	11:00:20	39620	73.8	10.60938	19	mower/blower
Whitman Mission NHS	10/7/2002	10:11:45	36705	72.9	18.30469	19	mower/blower
Whitman Mission NHS	10/7/2002	10:16:22	36982	72.5	20.06641	19	mower/blower
Whitman Mission NHS	10/7/2002	10:16:37	36997	69.7	10.10156	19	mower/blower
Whitman Mission NHS	10/7/2002	10:17:52	37072	69.6	19.11719	19	mower/blower
Whitman Mission NHS	10/7/2002	10:19:58	37198	76.9	17.66797	19	mower/blower
Whitman Mission NHS	10/7/2002	10:25:35	37535	76.0	20.90234	19	mower/blower
Whitman Mission NHS	10/7/2002	10:30:02	37802	75.7	18.58984	19	mower/blower
Whitman Mission NHS	10/7/2002	10:33:48	38028	75.3	17.32031	19	mower/blower
Whitman Mission NHS	10/7/2002	10:36:55	38214	73.9	16.30469	19	mower/blower
Whitman Mission NHS	10/7/2002	10:41:21	38481	72.9	16.53125	19	mower/blower
Whitman Mission NHS	10/7/2002	10:42:27	38547	69.6	12.36719	19	mower/blower
Whitman Mission NHS	10/7/2002	10:44:22	38662	71.3	18.05078	19	mower/blower
Whitman Mission NHS	10/7/2002	10:46:38	38798	70.2	15.13281	19	mower/blower
Whitman Mission NHS	10/7/2002	10:48:54	38934	69.1	11.53125	19	mower/blower
Whitman Mission NHS	10/7/2002	10:51:20	39080	69.6	17.53906	19	mower/blower
Whitman Mission NHS	10/7/2002	10:52:15	39135	70.9	11.67188	19	mower/blower
Whitman Mission NHS	10/7/2002	10:53:21	39201	69.0	16.0625	19	mower/blower

Whitman Mission NHS	10/7/2002	10:53:36	39216	70.2	10.03516	19	mower/blower
Whitman Mission NHS	10/7/2002	11:07:26	40046	74.1	16.50391	19	mower/blower
Whitman Mission NHS	10/7/2002	12:29:23	44963	79.9	23.49219	19	mower/blower
Whitman Mission NHS	10/7/2002	12:34:20	45260	74.5	14.51172	19	mower/blower
Whitman Mission NHS	10/9/2002	8:48:23	31703	69.2	23.93555	19	mower/blower
Whitman Mission NHS	10/10/2002	10:02:35	36155	75.9	17.94922	19	mower/blower
Whitman Mission NHS	10/10/2002	10:03:00	36180	76.7	21.79297	19	mower/blower
Whitman Mission NHS	10/10/2002	10:03:15	36195	76.7	15.06641	19	mower/blower
Whitman Mission NHS	10/10/2002	10:04:00	36240	74.9	20.21094	19	mower/blower
Whitman Mission NHS	10/10/2002	10:04:15	36255	79.1	15.08203	19	mower/blower
Whitman Mission NHS	10/10/2002	10:04:30	36270	80.2	15.08203	19	mower/blower
Whitman Mission NHS	10/10/2002	10:04:45	36285	78.6	15.07031	19	mower/blower
Whitman Mission NHS	10/10/2002	10:08:32	36512	75.3	23.14063	19	mower/blower
Whitman Mission NHS	10/10/2002	10:11:58	36718	74.9	16.10156	19	mower/blower
Whitman Mission NHS	10/10/2002	10:12:23	36743	72.7	10.33594	19	mower/blower
Whitman Mission NHS	10/10/2002	10:41:50	38510	74.3	15.03906	19	mower/blower
Whitman Mission NHS	10/10/2002	10:42:35	38555	76.1	18.63672	19	mower/blower
Whitman Mission NHS	10/10/2002	10:43:21	38601	77.8	19.27734	19	mower/blower
Whitman Mission NHS	10/10/2002	10:44:16	38656	74.9	19.46484	19	mower/blower
Whitman Mission NHS	10/10/2002	10:44:51	38691	74.7	17.87891	19	mower/blower
Whitman Mission NHS	10/10/2002	10:45:57	38757	76.6	19.42969	19	mower/blower
Whitman Mission NHS	10/14/2002	9:48:46	35326	68.8	11.84375	19	mower/blower
Whitman Mission NHS	10/14/2002	9:49:01	35341	71.3	15.09375	19	mower/blower
Whitman Mission NHS	10/14/2002	9:49:36	35376	77.3	21.41016	19	mower/blower
Whitman Mission NHS	10/14/2002	9:49:51	35391	76.6	15.04688	19	mower/blower
Whitman Mission NHS	10/14/2002	9:50:06	35406	75.9	15.10547	19	mower/blower
Whitman Mission NHS	10/14/2002	9:50:31	35431	75.0	24.93359	19	mower/blower
Whitman Mission NHS	10/14/2002	9:50:56	35456	77.1	16.05078	19	mower/blower
Whitman Mission NHS	10/14/2002	9:51:11	35471	76.9	15.08203	19	mower/blower
Whitman Mission NHS	10/14/2002	9:51:27	35487	75.6	15.07031	19	mower/blower
Whitman Mission NHS	10/14/2002	9:51:42	35502	75.1	15.0625	19	mower/blower
Whitman Mission NHS	10/14/2002	9:52:17	35537	79.3	24.28906	19	mower/blower

Whitman Mission NHS	10/14/2002	9:52:32	35552	77.8	15.02734	19	mower/blower
Whitman Mission NHS	10/14/2002	9:52:47	35567	77.5	15.07422	19	mower/blower
Whitman Mission NHS	10/14/2002	9:53:02	35582	77.5	15.07422	19	mower/blower
Whitman Mission NHS	10/14/2002	9:53:17	35597	76.1	15.08984	19	mower/blower
Whitman Mission NHS	10/14/2002	9:53:32	35612	74.5	15.10938	19	mower/blower
Whitman Mission NHS	10/14/2002	9:53:57	35637	73.2	24.99219	19	mower/blower
Whitman Mission NHS	10/16/2002	10:11:36	36696	71.5	19.42969	19	mower/blower
Whitman Mission NHS	10/16/2002	11:38:55	41935	71.9	13.08984	19	mower/blower
Whitman Mission NHS	10/16/2002	11:39:10	41950	76.5	15.03125	19	mower/blower
Whitman Mission NHS	10/16/2002	11:42:57	42177	75.0	22.20313	19	mower/blower
Whitman Mission NHS	10/16/2002	11:43:12	42192	76.4	15.15234	19	mower/blower
Whitman Mission NHS	10/16/2002	11:43:27	42207	75.3	12.51953	19	mower/blower
Whitman Mission NHS	10/16/2002	11:51:35	42695	71.2	11.79688	19	mower/blower
Whitman Mission NHS	10/16/2002	11:51:50	42710	76.3	12.69922	19	mower/blower
Whitman Mission NHS	10/16/2002	12:00:59	43259	68.0	13.14844	19	mower/blower
Whitman Mission NHS	10/16/2002	12:03:45	43425	69.5	16.72656	19	mower/blower
Whitman Mission NHS	10/16/2002	12:07:41	43661	72.2	15.75391	19	mower/blower
Whitman Mission NHS	10/16/2002	12:16:20	44180	73.1	24.36719	19	mower/blower
Whitman Mission NHS	10/16/2002	12:17:35	44255	71.9	11.22656	19	mower/blower
Whitman Mission NHS	10/16/2002	12:18:10	44290	73.6	20.99219	19	mower/blower
Whitman Mission NHS	10/16/2002	12:18:35	44315	72.1	12.49219	19	mower/blower
Whitman Mission NHS	10/16/2002	12:19:01	44341	75.5	21.48438	19	mower/blower
Whitman Mission NHS	10/16/2002	12:19:26	44366	75.9	17.76563	19	mower/blower
Whitman Mission NHS	10/16/2002	12:19:41	44381	76.4	15.05469	19	mower/blower
Whitman Mission NHS	10/16/2002	12:19:56	44396	79.3	15.10938	19	mower/blower
Whitman Mission NHS	10/16/2002	12:20:11	44411	79.1	15.14063	19	mower/blower
Whitman Mission NHS	10/16/2002	12:47:47	46067	75.7	24.19531	19	mower/blower
Whitman Mission NHS	10/16/2002	12:48:32	46112	73.7	20.13672	19	mower/blower
Whitman Mission NHS	10/16/2002	12:48:57	46137	75.5	17.70313	19	mower/blower
Whitman Mission NHS	10/16/2002	13:11:31	47491	72.4	20.76563	19	mower/blower
Whitman Mission NHS	10/17/2002	13:38:45	49125	71.5	16.22266	3	
Whitman Mission NHS	10/17/2002	16:27:16	59236	72.2	12.24609	2	

Whitman Mission NHS	10/17/2002	17:02:34	61354	71.8	16.21484	2	
Whitman Mission NHS	10/18/2002	12:40:56	45656	77.1	18.14844	19	Weed-wacker/mower
Whitman Mission NHS	10/18/2002	12:41:42	45701	72.9	15.83203	19	Weed-wacker/mower
Whitman Mission NHS	10/18/2002	12:41:57	45717	71.6	15.10938	19	mower/blower
Whitman Mission NHS	10/18/2002	13:31:01	48661	73.4	24.78906	19	Weed-wacker/mower
Whitman Mission NHS	10/18/2002	13:31:16	48676	71.3	13.28906	19	mower/blower
Whitman Mission NHS	10/21/2002	10:07:08	36428	73.1	19.41016	19	mower/blower
Whitman Mission NHS	10/21/2002	10:07:23	36443	78.0	12.58984	19	mower/blower
Whitman Mission NHS	10/21/2002	10:12:50	36770	72.2	13.95703	19	mower/blower
Whitman Mission NHS	10/21/2002	10:16:07	36967	72.4	15.03906	19	mower/blower
Whitman Mission NHS	10/21/2002	10:18:53	37133	70.6	15.15234	19	mower/blower
Whitman Mission NHS	10/21/2002	10:22:29	37349	69.3	13.88672	19	mower/blower
Whitman Mission NHS	10/21/2002	10:24:55	37495	75.4	17.73438	19	mower/blower
Whitman Mission NHS	10/21/2002	10:34:54	38094	76.4	16.97266	19	mower/blower
Whitman Mission NHS	10/21/2002	10:35:09	38109	79.5	15.08203	19	mower/blower
Whitman Mission NHS	10/21/2002	10:35:24	38124	81.4	15.07813	19	mower/blower
Whitman Mission NHS	10/21/2002	10:35:39	38139	76.4	15.08203	19	mower/blower
Whitman Mission NHS	10/21/2002	10:37:15	38235	73.9	16.74609	19	mower/blower
Whitman Mission NHS	10/21/2002	10:37:30	38250	75.2	15.08984	19	mower/blower
Whitman Mission NHS	10/21/2002	10:40:26	38426	74.4	17.96484	19	mower/blower
Whitman Mission NHS	10/21/2002	10:42:42	38562	72.2	14.85938	19	mower/blower
Whitman Mission NHS	10/21/2002	10:44:47	38687	70.6	11.30078	19	mower/blower
Whitman Mission NHS	10/21/2002	10:46:53	38813	70.5	10.24219	19	mower/blower
Whitman Mission NHS	10/21/2002	11:10:38	40238	78.0	16.17188	19	mower/blower
Whitman Mission NHS	10/21/2002	11:35:22	41722	74.1	16.71484	19	mower/blower
Whitman Mission NHS	10/24/2002	9:14:37	33277	71.9	22.63281	19	mower/blower
Whitman Mission NHS	10/24/2002	9:14:52	33292	72.1	15.10156	19	mower/blower
Whitman Mission NHS	10/25/2002	7:47:20	28040	73.5	21.55859	19	mower/blower
Whitman Mission NHS	10/25/2002	7:47:35	28055	73.4	15.07031	19	mower/blower
Whitman Mission NHS	10/26/2002	12:20:04	44404	77.0	17.09375	19	mower/blower
Whitman Mission NHS	10/26/2002	12:20:29	44429	78.5	16.76563	19	mower/blower
Whitman Mission NHS	10/26/2002	12:20:44	44444	78.0	15.03516	19	mower/blower

Whitman Mission NHS	10/26/2002	12:21:00	44460	75.9	15.06641	19	mower/blower
Whitman Mission NHS	10/26/2002	12:21:25	44485	77.5	22.85547	19	mower/blower
Whitman Mission NHS	10/26/2002	12:22:00	44520	78.2	23.70703	19	mower/blower
Whitman Mission NHS	10/26/2002	12:22:15	44535	77.9	15.05859	19	mower/blower
Whitman Mission NHS	10/26/2002	12:22:40	44560	76.2	18.21094	19	mower/blower
Whitman Mission NHS	10/26/2002	12:22:55	44575	77.5	15.06641	19	mower/blower
Whitman Mission NHS	10/26/2002	12:23:10	44590	77.6	15.06641	19	mower/blower
Whitman Mission NHS	10/26/2002	12:23:25	44605	77.1	15.00391	19	mower/blower
Whitman Mission NHS	10/26/2002	12:23:40	44620	76.6	15.10156	19	mower/blower
Whitman Mission NHS	10/26/2002	12:24:16	44656	73.0	10.83594	19	mower/blower
Whitman Mission NHS	10/26/2002	12:24:31	44671	73.5	15.08984	19	mower/blower
Whitman Mission NHS	10/26/2002	12:24:46	44686	75.5	15.05469	19	mower/blower
Whitman Mission NHS	10/26/2002	12:25:11	44711	75.8	19.42969	19	mower/blower
Whitman Mission NHS	10/26/2002	12:25:46	44746	71.3	16.90625	19	mower/blower
Whitman Mission NHS	10/26/2002	12:26:01	44761	68.6	12.23828	19	mower/blower
Whitman Mission NHS	10/26/2002	12:26:16	44776	68.3	11.83984	19	mower/blower
Whitman Mission NHS	10/26/2002	13:04:36	47076	73.4	10.33594	2	
Whitman Mission NHS	10/26/2002	13:05:01	47101	69.6	13.23438	19	mower/blower
Whitman Mission NHS	10/26/2002	13:08:17	47297	75.7	24.23438	19	mower/blower
Whitman Mission NHS	10/26/2002	13:08:32	47312	73.2	15.12109	19	mower/blower
Whitman Mission NHS	10/26/2002	13:08:57	47337	74.9	19.23047	19	mower/blower
Whitman Mission NHS	10/26/2002	13:09:12	47352	73.9	10.92188	19	mower/blower
Whitman Mission NHS	10/27/2002	18:23:41	66221	76.4	20.50781	22	
Whitman Mission NHS	10/27/2002	18:24:16	66256	69.9	19.65625	22	
Whitman Mission NHS	10/28/2002	10:24:13	37453	77.0	22.8125	19	mower/blower
Whitman Mission NHS	10/28/2002	10:24:28	37468	76.0	15.07813	19	mower/blower
Whitman Mission NHS	10/28/2002	10:24:43	37483	76.8	15.09375	19	mower/blower
Whitman Mission NHS	10/28/2002	10:25:18	37518	74.0	20.1875	19	mower/blower
Whitman Mission NHS	10/28/2002	10:25:33	37533	76.5	15.08984	19	mower/blower
Whitman Mission NHS	10/28/2002	10:25:48	37548	76.1	15.02344	19	mower/blower
Whitman Mission NHS	10/28/2002	10:26:04	37563	76.0	15.10938	19	mower/blower
Whitman Mission NHS	10/28/2002	10:26:19	37579	77.3	15.07031	19	mower/blower

Whitman Mission NHS	10/28/2002	10:26:34	37594	77.1	15.07031	19	mower/blower
Whitman Mission NHS	10/28/2002	10:27:19	37639	76.1	15.03906	19	mower/blower
Whitman Mission NHS	10/28/2002	10:27:34	37654	75.6	10.125	19	mower/blower
Whitman Mission NHS	10/28/2002	10:27:59	37679	73.6	20.82422	19	mower/blower
Whitman Mission NHS	10/28/2002	10:28:54	37734	73.5	24.32813	19	mower/blower
Whitman Mission NHS	10/28/2002	11:14:17	40457	70.1	10.27344	19	mower/blower
Whitman Mission NHS	10/28/2002	11:14:42	40482	75.4	21.89063	19	mower/blower
Whitman Mission NHS	10/28/2002	11:14:57	40497	74.6	13.28906	19	mower/blower
Whitman Mission NHS	10/28/2002	11:15:22	40522	71.6	18.15625	19	mower/blower
Whitman Mission NHS	10/28/2002	11:15:38	40537	75.6	15.05078	19	mower/blower
Whitman Mission NHS	10/28/2002	11:15:53	40553	75.8	15.06641	19	mower/blower
Whitman Mission NHS	10/28/2002	11:16:08	40568	75.6	15.10156	19	mower/blower
Whitman Mission NHS	10/28/2002	11:16:23	40583	77.5	15.03125	19	mower/blower
Whitman Mission NHS	10/28/2002	11:16:38	40598	77.0	15.11328	19	mower/blower
Whitman Mission NHS	10/28/2002	11:16:53	40613	74.3	15.0625	19	mower/blower
Whitman Mission NHS	10/28/2002	11:17:08	40628	78.0	15.04297	19	mower/blower
Whitman Mission NHS	10/28/2002	11:17:23	40643	78.9	14.19531	19	mower/blower
Whitman Mission NHS	11/3/2002	8:52:02	31922	74.9	24.03516	19	mower/blower
Whitman Mission NHS	11/3/2002	8:52:17	31937	71.2	12.37891	19	mower/blower
Whitman Mission NHS	11/5/2002	9:00:51	32451	76.2	11.61719	2	
Whitman Mission NHS	11/5/2002	13:38:34	49114	83.3	14.875	2	Also: Northern Flicker
Whitman Mission NHS	11/5/2002	14:18:15	51495	73.3	16.42188	3	
Whitman Mission NHS	11/6/2002	10:13:43	36823	73.3	17.41406	19	mower/blower
Whitman Mission NHS	11/6/2002	10:13:58	36838	74.8	15.07031	19	mower/blower
Whitman Mission NHS	11/6/2002	10:14:13	36853	75.3	15.05078	19	mower/blower
Whitman Mission NHS	11/6/2002	10:14:28	36868	75.3	15.14063	19	mower/blower
Whitman Mission NHS	11/6/2002	10:15:03	36903	73.1	23.11719	19	mower/blower
Whitman Mission NHS	11/7/2002	12:21:36	44495	75.0	16.96094	19	mower/blower
Whitman Mission NHS	11/8/2002	9:06:12	32772	73.3	17.59375	19	mower/blower
Whitman Mission NHS	11/8/2002	9:06:28	32788	75.3	15.11328	19	mower/blower
Whitman Mission NHS	11/8/2002	9:06:43	32803	73.1	15.04688	19	mower/blower
Whitman Mission NHS	11/8/2002	9:06:58	32818	72.2	15.10156	19	mower/blower

Whitman Mission NHS	11/8/2002	9:07:13	32833	71.8	15.13281	19	mower/blower
Whitman Mission NHS	11/8/2002	9:07:28	32848	70.2	12.96484	19	mower/blower
Whitman Mission NHS	11/8/2002	9:08:33	32913	72.8	24.52734	19	mower/blower
Whitman Mission NHS	11/8/2002	9:08:48	32928	72.6	12.84766	19	mower/blower
Whitman Mission NHS	11/8/2002	9:09:04	32944	72.6	15.02344	19	mower/blower
Whitman Mission NHS	11/8/2002	9:09:29	32969	74.8	20.46484	19	mower/blower
Whitman Mission NHS	11/8/2002	9:09:44	32984	71.1	10.03516	19	mower/blower
Whitman Mission NHS	11/8/2002	9:10:09	33009	69.7	10.30859	19	mower/blower
Whitman Mission NHS	11/8/2002	9:10:34	33034	69.5	17.41406	19	mower/blower
Whitman Mission NHS	11/8/2002	9:10:49	33049	73.0	15.08594	19	mower/blower
Whitman Mission NHS	11/8/2002	9:11:04	33064	70.8	13.83594	19	mower/blower
Whitman Mission NHS	11/8/2002	9:13:20	33200	70.1	15.23438	19	mower/blower
Whitman Mission NHS	11/8/2002	9:13:35	33215	72.8	15.11328	19	mower/blower
Whitman Mission NHS	11/8/2002	9:13:50	33230	72.2	15.07422	19	mower/blower
Whitman Mission NHS	11/8/2002	9:14:05	33245	69.6	15.08984	19	mower/blower
Whitman Mission NHS	11/8/2002	9:14:20	33260	70.2	15.13281	19	mower/blower
Whitman Mission NHS	11/8/2002	9:15:05	33305	69.5	22.45703	19	mower/blower
Whitman Mission NHS	11/8/2002	9:15:31	33331	73.5	10.78516	19	mower/blower
Whitman Mission NHS	11/8/2002	10:09:47	36587	71.7	18.30859	19	mower/blower
Whitman Mission NHS	11/8/2002	10:10:22	36622	71.3	16.49219	19	mower/blower
Whitman Mission NHS	11/8/2002	10:10:47	36647	75.1	20.64063	19	mower/blower
Whitman Mission NHS	11/8/2002	10:11:02	36662	72.9	14.15234	19	mower/blower
Whitman Mission NHS	11/8/2002	10:11:37	36697	71.2	10.54688	19	mower/blower
Whitman Mission NHS	11/8/2002	10:11:52	36712	75.5	15.08203	19	mower/blower
Whitman Mission NHS	11/8/2002	10:12:08	36728	72.0	15.05859	19	mower/blower
Whitman Mission NHS	11/8/2002	10:12:43	36763	70.0	19.35547	19	mower/blower
Whitman Mission NHS	11/8/2002	10:12:58	36778	73.5	15.04297	19	mower/blower
Whitman Mission NHS	11/8/2002	10:13:43	36823	72.5	18.44531	19	mower/blower
Whitman Mission NHS	11/8/2002	10:13:58	36838	76.8	12.13672	19	mower/blower
Whitman Mission NHS	11/10/2002	8:28:50	30530	73.8	15.08398	19	mower/blower
Whitman Mission NHS	11/10/2002	8:29:05	30545	73.3	15.10156	19	mower/blower
Whitman Mission NHS	11/10/2002	8:29:20	30560	68.7	15.07031	19	mower/blower

Whitman Mission NHS	11/12/2002	17:38:35	63515	69.0	18.71094	22	
Whitman Mission NHS	11/13/2002	15:43:03	56583	74.0	12.14844	2	
Whitman Mission NHS	11/13/2002	15:43:58	56638	71.0	17.02734	2	
Whitman Mission NHS	11/13/2002	15:46:14	56774	75.5	10.28516	2	
Whitman Mission NHS	11/13/2002	15:48:20	56899	73.2	11.23047	2	
Whitman Mission NHS	11/13/2002	15:51:16	57076	72.2	11.69531	2	
Whitman Mission NHS	11/13/2002	15:52:01	57121	71.9	10.74609	2	
Whitman Mission NHS	11/13/2002	15:53:57	57237	77.9	10.61719	2	
Whitman Mission NHS	11/15/2002	11:07:07	40027	71.1	16.30469	19	mower/blower
Whitman Mission NHS	11/15/2002	11:07:32	40052	76.4	20.54688	19	mower/blower
Whitman Mission NHS	11/15/2002	11:07:47	40067	77.7	15.11328	19	mower/blower
Whitman Mission NHS	11/15/2002	11:08:03	40083	76.7	15.08203	19	mower/blower
Whitman Mission NHS	11/15/2002	11:08:18	40098	76.4	15.07031	19	mower/blower
Whitman Mission NHS	11/15/2002	11:08:33	40113	77.2	15.12109	19	mower/blower
Whitman Mission NHS	11/15/2002	11:08:48	40128	77.1	15.05078	19	mower/blower
Whitman Mission NHS	11/15/2002	11:09:03	40143	75.1	15.09375	19	mower/blower
Whitman Mission NHS	11/15/2002	11:09:18	40158	74.9	15.05078	19	mower/blower
Whitman Mission NHS	11/15/2002	11:09:33	40173	69.8	13.07813	19	mower/blower
Whitman Mission NHS	11/15/2002	11:09:48	40188	70.4	15.05859	19	mower/blower
Whitman Mission NHS	11/15/2002	11:10:03	40203	74.7	15.11719	19	mower/blower
Whitman Mission NHS	11/15/2002	11:10:18	40218	70.4	15.00391	19	mower/blower
Whitman Mission NHS	11/15/2002	11:10:33	40233	69.7	15.04297	19	mower/blower
Whitman Mission NHS	11/15/2002	11:10:49	40249	73.3	15.07813	19	mower/blower
Whitman Mission NHS	11/15/2002	11:11:04	40264	70.9	15.19531	19	mower/blower
Whitman Mission NHS	11/15/2002	11:11:19	40279	71.1	15.03516	19	mower/blower
Whitman Mission NHS	11/15/2002	11:11:34	40294	71.8	15.08203	19	mower/blower
Whitman Mission NHS	11/15/2002	11:11:49	40309	70.9	15.07031	19	mower/blower
Whitman Mission NHS	11/15/2002	11:12:04	40324	71.4	15.03906	19	mower/blower
Whitman Mission NHS	11/15/2002	11:12:19	40339	73.8	15.09766	19	mower/blower
Whitman Mission NHS	11/15/2002	11:12:34	40354	73.6	15.08984	19	mower/blower
Whitman Mission NHS	11/15/2002	11:12:49	40369	70.4	15.05078	19	mower/blower
Whitman Mission NHS	11/15/2002	11:13:04	40384	72.9	15.07422	19	mower/blower

Whitman Mission NHS	11/15/2002	11:13:40	40420	73.3	19.26563	19	mower/blower
Whitman Mission NHS	11/15/2002	11:13:55	40435	73.3	15.05078	19	mower/blower
Whitman Mission NHS	11/15/2002	11:14:30	40470	71.9	21.19922	19	mower/blower
Whitman Mission NHS	11/15/2002	11:14:45	40485	75.0	15.01953	19	mower/blower
Whitman Mission NHS	11/15/2002	11:15:00	40500	74.8	15.08984	19	mower/blower
Whitman Mission NHS	11/15/2002	11:15:15	40515	76.0	15.11328	19	mower/blower
Whitman Mission NHS	11/15/2002	11:15:30	40530	78.3	15.04297	19	mower/blower
Whitman Mission NHS	11/15/2002	11:15:45	40545	77.0	15.10156	19	mower/blower
Whitman Mission NHS	11/15/2002	11:16:00	40560	74.7	15.08203	19	mower/blower
Whitman Mission NHS	11/15/2002	11:17:26	40646	76.7	21.30859	19	mower/blower
Whitman Mission NHS	11/15/2002	11:17:41	40661	74.5	15.05859	19	mower/blower
Whitman Mission NHS	11/15/2002	11:17:56	40676	75.6	15.12109	19	mower/blower
Whitman Mission NHS	11/15/2002	11:18:11	40691	77.7	15.05859	19	mower/blower
Whitman Mission NHS	11/15/2002	11:18:26	40706	77.3	15.03125	19	mower/blower
Whitman Mission NHS	11/15/2002	11:18:41	40721	76.6	15.06641	19	mower/blower
Whitman Mission NHS	11/15/2002	11:18:56	40736	78.0	15.05469	19	mower/blower
Whitman Mission NHS	11/15/2002	11:19:12	40752	77.2	15.16016	19	mower/blower
Whitman Mission NHS	11/15/2002	11:19:27	40767	75.8	15.12109	19	mower/blower
Whitman Mission NHS	11/15/2002	11:19:42	40782	75.9	15.09375	19	mower/blower
Whitman Mission NHS	11/15/2002	11:19:57	40797	77.8	15.07813	19	mower/blower
Whitman Mission NHS	11/15/2002	11:20:12	40812	75.1	15.0625	19	mower/blower
Whitman Mission NHS	11/15/2002	11:20:27	40827	74.1	15.05078	19	mower/blower
Whitman Mission NHS	11/15/2002	11:20:42	40842	73.5	15.07031	19	mower/blower
Whitman Mission NHS	11/15/2002	11:20:57	40857	72.7	15.08203	19	mower/blower
Whitman Mission NHS	11/15/2002	11:21:43	40903	71.1	22.29297	19	mower/blower
Whitman Mission NHS	11/15/2002	11:22:08	40928	73.0	25.03516	19	mower/blower
Whitman Mission NHS	11/15/2002	11:22:23	40943	71.6	15.08203	19	mower/blower
Whitman Mission NHS	11/15/2002	11:22:38	40958	75.3	15.0625	19	mower/blower
Whitman Mission NHS	11/15/2002	11:22:53	40973	70.3	12.3125	19	mower/blower
Whitman Mission NHS	11/15/2002	11:23:08	40988	70.5	15.12109	19	mower/blower
Whitman Mission NHS	11/15/2002	11:23:23	41003	69.7	14.10938	19	mower/blower
Whitman Mission NHS	11/15/2002	11:26:40	41200	74.6	22.74219	19	mower/blower

Whitman Mission NHS	11/15/2002	11:30:46	41446	70.8	16.75781	19	mower/blower
Whitman Mission NHS	11/15/2002	11:31:01	41461	76.8	15.07031	19	mower/blower
Whitman Mission NHS	11/15/2002	11:34:48	41688	73.5	20.99219	19	mower/blower
Whitman Mission NHS	11/15/2002	11:35:03	41703	75.1	15.09766	19	mower/blower
Whitman Mission NHS	11/15/2002	11:35:18	41718	76.6	15.04688	19	mower/blower
Whitman Mission NHS	11/15/2002	11:39:14	41954	75.5	17.95703	19	mower/blower
Whitman Mission NHS	11/15/2002	11:44:51	42291	75.4	20.23828	19	mower/blower
Whitman Mission NHS	11/15/2002	11:47:57	42477	73.9	10.66406	19	mower/blower
Whitman Mission NHS	11/15/2002	11:51:03	42663	72.6	13.83203	19	mower/blower
Whitman Mission NHS	11/15/2002	11:53:29	42809	75.5	17.14844	19	mower/blower
Whitman Mission NHS	11/15/2002	11:53:44	42824	75.8	15.09375	19	mower/blower
Whitman Mission NHS	11/15/2002	11:54:00	42840	70.6	12.85938	19	mower/blower
Whitman Mission NHS	11/15/2002	12:36:21	45381	72.0	12.67188	19	mower/blower
Whitman Mission NHS	11/15/2002	12:38:47	45527	70.5	11.74609	19	mower/blower
Whitman Mission NHS	11/15/2002	12:41:43	45703	69.5	11.95313	19	mower/blower
Whitman Mission NHS	11/15/2002	12:56:45	46605	70.0	13.09766	19	mower/blower
Whitman Mission NHS	11/20/2002	9:29:24	34164	68.6	10.91797	2	
Whitman Mission NHS	11/20/2002	12:49:17	46157	79.7	18.08984	19	mower/blower
Whitman Mission NHS	12/14/2002	13:55:43	50143	78.4	22.71094	21	
Whitman Mission NHS	12/14/2002	14:18:38	51518	77.6	11.89063	21	
Whitman Mission NHS	12/14/2002	14:19:43	51583	75.7	17.69141	21	
Whitman Mission NHS	12/14/2002	14:19:58	51598	77.7	10.36719	21	
Whitman Mission NHS	12/14/2002	14:25:16	51916	74.2	10.14453	21	
Whitman Mission NHS	12/14/2002	14:25:41	51941	74.7	14.44141	21	
Whitman Mission NHS	12/14/2002	16:56:20	60980	76.6	12.67188	21	
Whitman Mission NHS	12/14/2002	16:57:26	61046	80.0	11.65625	21	
Whitman Mission NHS	12/14/2002	16:58:01	61081	77.6	15.16797	21	
Whitman Mission NHS	12/14/2002	17:03:18	61398	73.3	15.38672	21	
Whitman Mission NHS	12/14/2002	18:38:53	67133	78.5	16.71094	21	
Whitman Mission NHS	12/14/2002	18:39:08	67148	80.7	11.625	21	
Whitman Mission NHS	12/14/2002	20:29:49	73789	79.2	11.75	21	Also: Canada Goose
Whitman Mission NHS	12/14/2002	20:39:58	74398	78.5	10.64063	21	

Whitman Mission NHS	12/14/2002	20:42:14	74534	77.7	15.49219	21	
Whitman Mission NHS	12/14/2002	21:16:04	76564	76.7	12.80469	21	
Whitman Mission NHS	12/14/2002	21:45:41	78341	78.1	12.01563	21	